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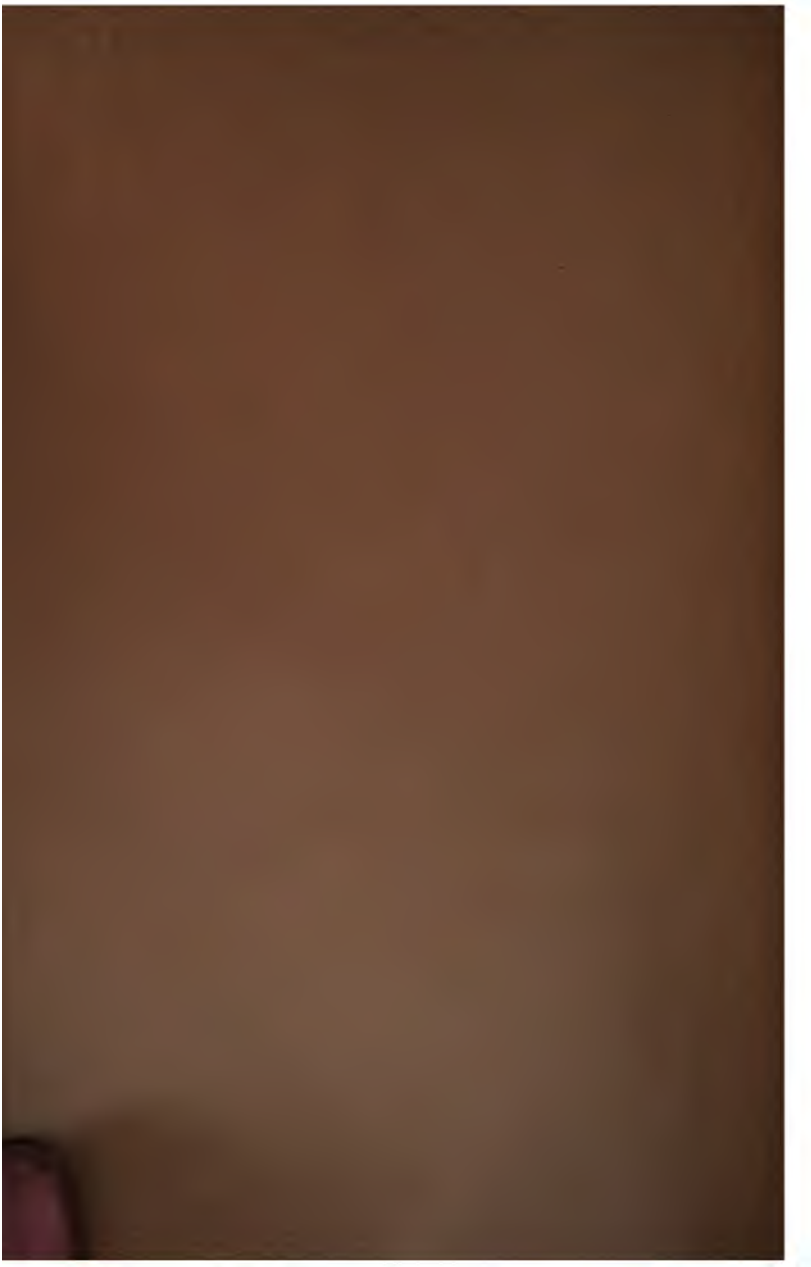


VICHY

VICHY
A. WALLON, PRINTER

THE MINERAL WATERS

OF

VICHY

THEIR ORIGIN. — PHYSICAL PROPERTIES
CHEMICAL COMPOSITION AND CURATIVE EFFECTS
THE DISEASES IN WHICH THEY ARE ORDERED AND THE WAY
IN WHICH THEY MUST BE PRESCRIBED

WITH REMARKS ON THE ADVANTAGES
OF GRADUATED GLASSES (VERRES GRADUÉS) TO BE USED
IN DRINKING AT THE SPRINGS

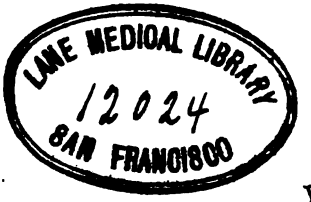
BY

Dr CASIMIR DAUMAS

CONSULTING PHYSICIAN AT THE VICHY WATERS

Corresponding Member Medical of the Society of Bordeaux,
Knight of the Légion of Honour and of Saint-Gregory the great Officer of the Order
of the Nichan of Tunis, etc., etc.

FOURTH EDITION



VICHY

A. WALLON, PUBLISHER

1867

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PREFACE

TO THE FIRST EDITION.

I dedicate this unpretending volume, to those of my confreres, who have had no experience in the practice of medicine at our mineral springs.

I do not present to them an elaborate work on the subject, but some observations bearing particularly on the Vichy waters.

I have endeavoured, in a slight degree, to supply them with such information, as they could not acquire at a distance from the springs, and to give them in a few pages, all that is necessary to enable them safely to send their patients to the thermal waters.

Mineral springs are the most effective remedy in chronic diseases; it is a fortunate circumstance that they are now becoming of more general use, but the beneficial effects resulting from them, would be far

greater if the precise value and the full results of that mode of treatment, could be ascertained.

To attain that desirable object, the co-operation of our professional brethren, is necessary.

It would be desirable in fact, that patients coming to the waters, should bring with them, a pathological statement of their disease, by their ordinary physician, to whom we would send all the details and the immediate effects of the treatment, at the waters. On the patients return, his physician would have to watch over and inform us of the consecutive effects of the treatment.

Should this appeal prove successful, this little book will perhaps have a favourable result, and my time will have been usefully employed in the interest of science and invalids.

PREFACE

TO THE SUBSEQUENT EDITIONS

I published last year (1862) *Scientific and Medical remarks, on the Waters of Vichy*, from which I borrow the following preface, giving the principal object I had in view, in publishing the present work.

The medical question of the mineral waters of Vichy, as I endeavoured to explain it two years ago (1860), has been favourably received by several members of the medical profession, and by the public.

Were I permitted to examine the causes of that favourable reception, I should perhaps find them, in the scrupulous care, with which I sought to remove from my mind, while writing, every influence not identified with the interest of the sick, and with truth, and above all in the firmness with which I *(the first to do so)* opposed treatment by large doses, and ur-

gently recommended *small doses*, as an indispensable condition of proper medical treatment at Vichy.

I even claim as meritorious on my part, that priority, entirely apart from all scientific pretension, because, in being the first to recommend this mode of treatment, I believe I have rendered an important service to the invalids frequenting our thermal springs.

When Dr Petit undertook to revive at Vichy, the fatal doctrine of acid and alkali which had become obsolete and forgotten during the last two centuries, it is well known, with what enthusiasm, the public adopted the *saturation* system, which was its necessary consequence. Around the fountains, crowds of imprudent drinkers rivaled with each other in the immoderate use of the waters.

There thronged daily, eager and acid drinkers, alkalising and saturating themselves, to death's door.

It was, however, we must admit, most marvellous, to hear the poor patient discussing the whole process of his cure — he could in a most professional way lecture on the original causes of disease, and defend the neutralisation of acids by alkali. He could in fact, eloquently describe the whole medical doctrine of Doctor Petit.

Such a display of scientific knowledge, could not fail to be a source of vanity. This explains too, the great reputation of the former Inspector, a very unfortunate reputation indeed, since it appears to have

triumphed over the eminently medical genius of Doctor Prunelle. As a general rule, theories in medicine should be distrusted, above all, if they are such as every body can understand. The theory of Dr Petit, though without the merit of novelty (1), is at one and the same time opposed to common sense, and medical knowledge; to reason, and to facts.

His great error, in fact, consisted in not being fully aware of the powerful effects of the waters of Vichy.

Owing to his ignorance in this respect, invalids were led to consider the waters as perfectly anodyne; they drank them heedless of their immediate or future evil effects, and with the sole object of destroying the acid in the system.

When fully alkalised and saturated, two or three months after the cure, the greater number fell into a state of debility and prostration, often of an incurable nature. Others after two or three years of apparently successful treatment, succumbed suddenly.

Of the eighty gouty patients reported to the Academy of Medicine by Dr Petit, as having been cured by his mode of treatment, it would be at the present day, difficult to find two who have not been unexpectedly carried off by a relapse of gout. And be it remembered, I only speak here, of the remote results of

(1) See our critical letter upon the alleged solvent and liquifying action of the Vichy waters.

drinking the waters. What task would be more sad, than to have to relate the immediate evil results which occurred and to describe the failure of the treatment. To see patients losing by an immoderate use of the waters, the benefits which they might fairly expect; to become more ill, sometimes even to die, when a cure was possible!

Thus it is that a remedy, in every respect precious and beneficial, had been, by an erroneous theory, converted into a dangerous and mortal weapon.

It took a long time to discover this truth, to which we shall again refer.

On our arrival at Vichy, the opinions of Dr Petit, were abandoned to a certain extent, by a few of our medical brethren, but his system was still too much in vogue; ten, fifteen and even twenty glasses of water continued to be daily prescribed to patients, at which we were utterly astonished, we, who had resolved to apply to the special therapeutics of the waters, the principle (somewhat neglected perhaps) of general therapeutics.

Why should chronic diseases be treated less seriously and prudently, than acute ones; why should the thermal medication be consigned to neglect, without limit or rule, instead of being watched, directed, and measured like any other.

MODE OF TREATMENT.

The chemical composition of the Vichy waters indicates *a priori*, their great activity; and experience soon showed their violent and dangerous effects, when administered imprudently, and in large doses.

Having been requested by the Minister, in the following year, as a non-military doctor, to undertake medical duties, at the thermal military hospital of Vichy, we had the opportunity of appreciating, by more precise observation than town practice affords, and contrary to the traditions which then prevailed and are still observed in that hospital, the advantages and the incomparably greater degree of efficiency of the waters, when administered, in small doses. There it was, that our convictions were completely formed, and the rules of our practice definitely established.

Both are based upon facts conscientiously studied, and we may sum them up in the two following propositions which invalids will do well to study, viz:

First,

That the Vichy waters acting powerfully on the system, and being capable of doing as much harm as good, should only be used with caution and prudence, and with the knowledge and medical skill necessary, when powerful remedies are employed :

Secondly,

That the success or failure of the cure, depends absolutely on the administration of the waters, on the manner in which they are prescribed and taken, intelligently or unskilfully, moderately or immoderately.

And lest there should be any doubt sa to the meaning of the rather vague expression "*Small doses*" which we have used, we would specify the quantity at seven or eight hundred grammes, or about three glasses per day, as the maximum dose, which it is useless, as well as dangerous to exceed, and which we rarely order in our usual prescriptions.

1863.

Such are the ideas which, we have endeavoured to develope in this work, in defence of which we have not ceased labouring, and which, after a further experience of three years, supported by numerous facts conscientiously observed and considered, we once more affirm with a strong conviction enlightened by experience. Those ideas contain the whole truth, and we can affirm that the doctrine of *small doses* has obtained the assent of all those medical men who have not practised at the thermal springs.

The system is in fact one, to be decided by common sense, reason, and therapeutic science.

Some of our confreres at the springs have also adopted and applied it; I thank them for having done so. —

One among them forgetting no doubt a recent work bearing his name, went so far as to attempt to take the credit of it from me, and to plume himself upon it : it is a good sign (1).

But what is more important and more worthy of appreciation is, that in the minds and habits of the visitors to the waters, the *saturation* system has lost its influence and is declining rapidly. It is a success on which we can both pride ourselves and congratulate them.

Dr CASIMIR DAUMAS.

March 1866

(1) See the note on the graduated mensure glasses.

PREFACE

BY THE TRANSLATOR.

In giving the translation of a work on the Vichy waters, by an eminent and experienced physician, I believe I am rendering a service to English practitioners and invalids.

I feel this conviction, particularly as in this volume for the first time, the great importance of these waters in chronic disease, has been fully understood and described.

J. P. L.

Paris, 6th January 1867.

THE

MINERAL WATERS OF VICHY.

Vichy *(Vicus calidus)* is one of the moſt celebrated and ancient thermal watering places in France.

It is situated on the banks of the Allier, in the middle of a valley, surrounded by slightly elevated hills. We find that two hundred years ago, it was resorted to by the people of the neighbourhood as well as by the more wealthy class of invalids who could afford to come from a diſtance, to make a trial of the waters. The firſt Inspector of the springs was appointed by edict of Henry the 4th in 1603.

Madame de Sévigné has left us some charming sketches of the hot springs of Vichy, familiar to every one. She graphically describes the manner of the people, and the rank of the visitors. Her letters are therefore doubly interesting, as they contain almost as good medical and better literary knowledge, than will be found in the writings of the physicians of her time.

Many historical names figured in the society in which the marchioness lived. Her letters moreover form a part of history, and in reading them, we can see that the aristocracy of that period lived at the springs with less material comfort, and were not more gifted in devising sources of amusement than modern bathers.

It was then the fashion to pay more frequent visits; to spend long hours looking at the peasants dancing "*la bourrée*"; and the rest of the time in contemplation of the scenery. "I am to remain, alone, and I am delighted; "provided I am allowed, to enjoy the sight "of this lovely country, with its river Allier

" its numerous clumps of trees, its rivulets " and meadows, sheep and goats, and peasant " girls dancing in the fields. "

During her rambles, this charming woman thought of the delights of Aſtrea, and despite her Rheumatic gout, imagined she might at any moment meet a Lignon shepherd.

In our days people no longer expect such viſions, but nevertheless the scenery being as lovely as ever, they think it is better to live and bathe at Vichy, in the nineteenth, than in the seventeenth century!

We go further: our epoch is far above any comparison of this kind, and we are surprised at having made it.

People do not in general form a sufficiently exact idea of that Society of the 17th century so often deſcribed, and so much admired; they lose sight of the neglect of cleanliness, and the personal indelicacies which were there concealed under gorgeous appearances, but were so perceptible to the faſtidious Louis the 13th that he availed himself of a pair of tongs

to take from his favourite Mademoiselle de Hautefort, a note which that lady had concealed in her bosom.

Bathing was not then the fashion; society in fact seemed affected with hydrophobia, and no one bathed.

I think it is M^r^ Michelet who designates the age of Francis the 1^st^, as " that of the itch "; the epithet is equally applicable to the 17^th^ century; itch and other parasitical diseases, the punishments of a want of cleanliness. Henry the fourth, emblematic of gallantry, beſtriding the two eras, would truly represent their leading characteriſtics : gallantry and filth.

In the regiſtry kept by Hérouard, chief physician to the court, in which during twenty-eight years, he gives a daily record of his prescriptions, and notes down the hourly cupations of Louis the 13^th^, we fail to discover that his doleful majesty, sufferer as he was, from melancholy and bile, ever once took a bath.

King *soleil* (Louis 14th) took but one bath in all his life, and used to wash his hands, or rather the tips of his fingers, in spirits of wine, and Madame de Longueville, that beauty to whom Mr Couſin has so artiſtically and lovingly recalled our attention, used to wear soiled petticoats, and is said by Bussy Rabutin to have smelled badly, intus & extra.

These revelations are truly disguſting, but we see in the journal of the king's health, kept by Fagon and two of his confreres, successively, that the great king liked to physic himself, and that in one year, he took more than two hundred purgative draughts. This would have killed an oſtrich, but killing would perhaps have been better than remaining unwashed, and getting the abdomen of a Japaneſe bonze.

The water drinkers of former days, like those of the present, seem to have been chiefly occupied with their respective ways of taking care of their health. "The water, says Madame de Sévigné, is taken the firſt thing in

the morning: then it operates and the manner of its operation forms the topic of confidential converſation until noon". The spending the reſt of the day in quiet contemplation muſt have aided the effect of the treatment. But Vichy could not be said then to possess a real warm bathing eſtablishment. All the accessories were contained in a small building which afforded but little protection from the weather, and the few bath rooms were contended for — I miſtake, were not contended for — very eagerly by rich, poor, and noble, by men, and women. This building was called the "king's house", and over the door was seen this rude and coarse inscription.

Lavate et porta grabatum.
Wash and take away your linen.

We think so indeed!

We know what Madame de Sevigné said of the douche; with our present ideas of cleanliness, baths so arranged muſt appear horrible. The hot water treatment of that

period consisted chiefly in taking the water internally. This system continued till the formation of the present establishment in 1829, notwithstanding the improvements which were commenced after Mesdames Adelaide and Victoria, aunts to Louis 16th, visited the place in 1785.

The thermal Establishment of Vichy is now unquestionably the finest in France. We are not now eulogising its artistic beauties, but its interior arrangements (medically) are admirable. It consists of three separate buildings, each containing a complete bathing apparatus. The largest owes its origin to the munificence of Mesdames de France, aunts of Louis the 16th. Then comes the small hospital establishment, and thirdly the new building erected by the Company appointed to the supervision of the mineral springs, in order to meet the requirements of the increased influx of invalids. These three buildings contain between them more than three hundred baths or piscines : and forty closets for different descriptions of

douches. A bath of an hour suffices for each patient, so that upwards of three thousand persons can be accomodated daily at Vichy.

The Eſtablishment is greatly indebted to the managing Company, both in regard to the manner in which the water has been laid on, and the vaſt improvements made in the interior arrangements. The greateſt attention is paid to the cleanliness and comfort of the baths, which are of sufficient size, and the cabinets well lighted. The douches are conſtructed on a new principle and act admirably. There is room for the inhalation of the carbonic acid gas arising from the springs. In every arrangement, the comfort of the patient and the facility of the medical treatment have been kept in view. The result is such as to call for our gratitude, as a well conducted thermal eſtablishment greatly contributes to the efficacy of the waters : and the administration, by furnishing the physician with increased facilities for the treatment, has conferred

a benefit on medical science, as well as on the patients.

We cannot conclude this short introduction without a reference to the completion and inauguration of the *Casino*, constructed from the designs, and under the superintendence of that able and talented architect M. Badger. The new edifice which Vichy owes to the kindness and munificence of the Emperor, does not possess the grand proportions which would entitle it to the designation of a monument: but it presents a gay and lively appearance suitable to a watering place, where everything should tend to exercise a cheering influence on the minds of the visitors requiring amusement and relaxation. In this design, both the Administration and architect have admirably succeeded. The interior construction has been skilfully planned, with that thorough adaptation to convenience and comfort, of which English architects alone possess the secret.

We merely indicate the fact, leaving the task of description to others, but let us add, that the Casino marks a stage on the road of progress and improvement, which is being so successfully pursued by the Directors of the Vichy water company.

CHAPTER THE FIRST

GENERAL CONSIDERATIONS — TOPOGRAPHY. GEOLOGY — ORIGIN — PHYSICAL AND CHEMICAL PROPERTIES OF THE WATERS OF VICHY.

There were once at Vichy six springs, all natural ones, which formed the thermal eſtablishment and sufficed for the wants of the patients; at presents there are ten without counting that of Cusset.

This increase, partly arising from the appearance of new springs, is principally due to borings effected of late years. — The former springs, those exiſting in the 17th and 18th centuries, and of which one only, the *Puits-Carré*, was kept for the uſe of invalids in *La*

maison du Roi, were all situated in the space exiſting between the Celeſtins and the great Eſtablishment, at moſt about a kilometre diſtant. This space formed the old basin, and still conſtitutes the Vichy valley; the diameter and circumference of which, by the addition of other springs, have been considerably increased.

The former springs are: the *Hopital*, the *Grande-Grille*, the *Puits-Carré*, the *Puits-Chomel*, the spring *Lucas* and that of the *Celeſtins*.

The new ones compriſe, the spring *Lardy*, the *Parc*, *Mesdames* and *Hauterive*.

These latter been obtained by borings or artesian wells.

Such an abundance of water flowing up in the same place, leads the mind to think of the phenomena which produce it. A moſt intereſting queſtion it is, and one we were wrong in neglecting in our firſt edition, because it oſten intereſts the bathers at Vichy.

§ 1st

TOPOGRAPHY. — GEOLOGY.

On the topographical position of Vichy we shall touch but briefly.

Landscape literature is but cold and pretentious — people go faster and learn better with steam engines and by rail. Those who love and admire the calm and beauty of nature, should travel to Vichy.

It is well known that Madame de Sévigné was poetically inspired by the temperate climate and the variety of the landscapes, including as they do, fresh valleys, flowery slopes, fragrant orchards and lovely groves lining the meadows. The high mountains of Auvergne are seen in the distance sending up clouds of mists which fall in dew drops on the green foliage.

It would in fact be difficult to find a spot on earth, better calculated for moderate pleasures and those peaceful emotions best suited

to the melancholy and enfeebled invalids and convalescents who visit the waters.

Vichy, we said, is situated in the centre of a valley, surrounded on every side, by small hills.

It is moſt important, in order to underſtand the geological phenomena of the place, that the reader should form a correct notion of the position.

Let us suppose a funnel or a salad dish filled with earth to within two inches of the edge.

For more precision, let the edge be scooped down, in some places, to a level with the earth.

It is by one of these little hollows that the Allier, penetrates into the valley, and crosses it from north to south, for a diſtance of four or five leagues.

The Vichy valley is said juſtly to be connected geographically with La Limagne, that is with the long lines of plains, hemmed in by hills, touching each other and following the course of the Allier, from the mountains of Auvergne to the Bourbonnais.

There is in fact between the different points in this country, an affinity of form and appearance that cannot be conteſted.

But there was perhaps less reaſon for ſuppoſing that this vaſt extent of land occupies the place of an immense fresh water lake; others have added that this water was carried by degrees through rivers and streams to the sea — a queſtion will be asked, where is the sea? — and that in fine all the waters were united to form the Allier.

If the plains of the Limagne, the valley of Vichy included, were formerly submerged, it muſt have been in the time of Noah's ark, and we muſt believe it in order to remain faithful to Holy Writ.

But whether these same plains were in former times, a lake, that we cannot say, becauſe nothing proves it, and as to one of our confreres who affirms it

« Comment le saurait-il, puisqu'il n'était pas né? »
(Here could he know it since he was not born?)

The queſtion is however an idle one,

which need not be treated in this work seriously. The exiſtence of this great lake, even were it possible to prove its exiſtence, would be of no value, relative to the subject we are treating.

In these large plains of the Limagne, it is probable that fire and water were often united in action, when forming the cruſt of the earth, but Pluto's work was the principal one, whereas Neptune's labours were only an accessary, and so far as the origin of the Vichy springs is concerned, had the God of the waves, even brought to this place his two oceans, and to mark his course, strewed about those same pebbles, which are now shown to us — and which are do not conteſt — and struck the wet rocks with his terrible trident, it would not be to him, that the present generation would owe the smalleſt stream of mineral and thermal water. He did not even contribute to the formation of the springs. And here it appears intereſting to us, to give the ideas of the Chinese, who form a contrary opinion of the origin of thermal waters :

"There, say the learned men of the "Celeſtial Empire, the spirits of drought and "moiſture fought a great battle — a terrible "struggle, for, such was the fury of the "combatants, that the moſt opposite proper- "ties remained indissolubly mixed up to- "gether on the scene of action."

Moſt certainly it is an ingenious and proper way of procuring warm water to place it in close connection with fire! The great lake in queſtion might have been heated in the same manner, but in this particular case, the Chinese are miſtaken. Those who are inclined to believe that the supposed inundations of the Limagne are in any way the cause of the formation of the Vichy springs are miſtaken also. That is the only important thing to be noticed, and we were anxious to mention it.

* * *

Let us cease referring to the plains of the Limagne and confine ourselves to the plain of

Vichy — we have compared it to a funnel filled with sand and nothing can be more exact; we resume the comparison.

It is universally admitted that the rocks which form the sides and the bottom of the funnel are in their nature and formation different from the soil by which it is filled.

To form the firſt, a violent and isolated volcanic action was requisite, — the second, on the contrary, is owing to the combined action of fire and water.

Thus the real layers of soil, the primitive ones, by virtue of this common rule, that to fill a funnel, a funnel muſt be found, are the *volcanic rocks or igneous volcanic rocks* as people may prefer to call them.

After, came, sedimental lacuſtrian or *alluvial* soil, deposited in successive layers so as to fill up slowly the original abyss.

The inveſtigations which have been made into the nature of these soils, have shown that they are composed throughout of claymarl, and calcareous sand. Their colour is whitish

or greyish, according to the places where they are taken. In the environs of Sichon for inſtance, this latter colour is very marked.

In the different borings made, the borer has been conſtantly stopped at a certain depth, by a reddish argillaceous layer which "seemed to exiſt everywhere on the same level" said M^r^ Dufersnoy, inspector general of mines, and dividing the alluvial soil into two parts — It is like a plank suspended horizontally. Beneath this layer there are sands of the same nature and colour as above, that is to say, loam, argillaceous and calcareous matter mixed, and ochreous earth having little solidity and easily impregnated with water.

Let us now reason on those positive results, so as to confirm what we said relative to the formation of the soil.

An important observation, which muſt not be loſt sight of in a geological inveſtigation, is, that the volcanic rocks are diſtinguished from alluvial grounds less perhaps by their composition, than by their form and structure. —

Thus in both, among other properties, lime is to be found; but this subſtance exiſts in a cryſtalised state; and is so *always* in volcanic rocks and *never* in aqueous formations. A good example in support of this fact is to be found in the *Celeſtins* rock, an enormous block of aragonite which resembles so little the argillaceous calcareous matter around it.

Aragonite is however a species of carbonate of lime, but it is carbonate of lime in a *cryſtalised* state.

Cryſtallisation is, in geology, the touch-stone of creative power.

Wherever we meet at the surface, or in the depths of the earth, products which bear its impress, we may be certain that fire and volcanic eruptions have originated them. Where no signs of cryſtallisation appears, the earth owes its exiſtence to the action of the waters. We were consequently right when we ascribed a different origin to the rocks which surround the Vichy valley, and the soil which fills it up.

All those rocks are like those of the Celeſtins, of cryſtalline form, and they are all the result of volcanic erruptions. They are porphyry, and basalts, composed of quartz aragonite, amphibole, that is, combinations of silicious acid, with soda, potash, magnesia, lime, iron, manganese, &c., &c., combinations in which, the latter subſtances predominate.

We moreover find them in abundance in the mineral waters.

To show now how alluvial soils were deposited in this volcanic valley and filled it up, is an easy matter.

The water from outside in reaching by natural slopes the bottom of these excavations attacked the surface of the rocks and by softening them deſtroyed their cryſtallised state. It took off portions of their subſtance, destroying and reducing them to sand, mixing, them up with the detritus taken up in its passage, forming a clayey subſtance which it deposited in successive layers according as the heat of the sun or burning emanations from the

earth causes them to evaporate. In this way, a clayey soil has been formed, and this is why we find the remains of volcanic rocks, fragments of porphyry, mixed up with the soil, calcareous subſtances which compose it, scoria, and volcanic subſtances, but slightly changed.

And to accomplish this work of erosion and sedimentation, was it necessary to have an immenſe lake; is it particularly necessary to have a lake that would flow to the sea after having accomplished this labour? Moſt certainly not! How are the deposits in lakes, those in torrents, and the duſt of mountains formed?

Atmoſpheric air works on the rocks by oxygen and carbonic acid; rain water in flowing over the hills, and humidity, were sufficient to do this; and they accomplished it, by deſtroying themselves at the time they were formed.

It is well to add as a laſt observation, that the facts we mentioned, continue to operate daily under our own eyes, and unseen by

us, but that, the Vichy valley was perhaps already filled up at the time of the deluge.

§ II

ORIGIN OF THE WATERS.

Let us now suppoſe that of all these alluvial grounds brought together by the effects of time no traces remain, and let us dig down into the valley, until we reach the hard rock so as to shew it such as it exiſted in primitive times.

From borings made, the depth of the sand which fills it varies from 150 to 200 metres. This shows us the depth we would have to reach before coming to the bottom. It is on this foundation and by no means on the soil above it, that we muſt look for the thermal springs.

In early times, before the cruſt of the globe had attained the depth and consiſtency it has at present, strange and splendid phenomena muſt have taken place upon this spot. Whilſt the volcanœs of Auvergne, Mont-Dore and

the neighbouring mountains, threw up torrents of lava, the earth muſt have felt at a great diſtance the terrible volcanic movement, and muſt have been raised up and torn in more than one place. If we said all we think of the Vichy valley, we would say that it was formed from the rending of the mountains which surround it, and which, united in the begining in a compact form, were torn asunder by an ulterior movement of the central fire — perhaps the one which produced the Celeſtins rock.

However that may be, the surface of the earth is never raised up in one point without producing a corresponding lowering elsewhere. Everywhere in the neighbourhood of volcanos we find the surface pierced with holes and gaps, which are the orifices of subterranean cavities; these being irregularly placed over each other, and communicating between each other, penetrate and come into contact more or less directly, with the central mass. It is by these orifices, that the vapours produced by

subſtances in ebullition and kept down under the cruſt of the globe, find an issue out, and are spread about in the atmosphere. A comparison will make the idea clearer; let us call them the orifices of chimneys while it is in the centre of the earth that the focus or boiler is placed.

In great eruptions, whilſt the central fire concentrates all its efforts on one point, and the boiling lava rises up and rushes towards the mouth of the craters, theſe chimneys are at reſt. Some become closed and are replaced by others, but after the eruption, when the lava goes back to the crater, they are observed to become active again and give passage, no longer like volcances, to melted subſtances, but to their *emanations*. I underline the word; the latter smoke; the former throw out pulverised scoria; others throw up into the air columns of water from which they are called, hot water volcanoes.

It is important to underſtand the mechanism of those two phenomena.

In the centre of the globe, a permanent fire

and quantities of subſtance in a state of fusion, which sometimes burſt forth from some violent subterranean action, and come out by the opening of the craters, and at others, boil up without effervescence, sending out by the crevices of the orifices only burning emanations of vapour and water.

This is the entire theory of thermal waters, and it becomes easy to explain, not only their production, but their different temperature and their nature.

Whether we speak of a flow of lava or simple fiery eruptions, the water vapour, as is well known, plays a conſiderable part in volcanic phenomena mixed up with other elaſtic fluids, such as carbonic acid, and gas formed from melted subſtances, it escapes in columns of smoke from the mouth of the volcanoes, before, after, and during the eruptions. They form, over the craters, thoſe heavy clouds which after remaining some time in the atmosphere, become condenſed, and burſt in torrents of rain : and we will state here that though the

Mont-Dore and the Puy-de-Dome are entirely extinct, this is the only cauſe of the fogs which ſurround their ſummit and cause such frequent storms in the neighbouring country.

In the same way, the internal emanations which succeed eruptions and replace them long after volcanic action is extinguished, are composed also of water vapour, carbonic acid, and evaporations from the central fire. They make their way through the crevices and cavities of the terreſtrial cruſt, and mount towards the atmosphere which they reach, the more dense and charged with smoke, that they come out in a direct line.

Let us now suppose, that in their upward passage, they had time to become condensed and to cool, till they reach that degree of temperature in which the vapour of water becomes liquid : inſtead of a column of smoke, we should then see coming forth a spring.

Such is the origin and formation of the greater number of mineral springs.

It is not difficult afterwards to explain the

difference of their temperature varying between freezing and boiling points. It is caused by the different length of their passage before reaching the surface of the earth, and with springs of the same locality, the point of origin being the same, those will be the warmer which have followed a less winding direction and remained a shorter space of time in the interior of the earth. As for their nature, it depends upon that of the rocks from which they issue, and it must be so, as these same rocks existing in a state of lava now cooled down, formerly constituted a portion of the igneous matter from which the sources spring. Thus we see in the analysis of the Vichy waters, that they contain, united to carbonic acid, all the alkaline substances which we observed in such great abundance in the primitive base of the soil.

It is true, that such a result is obtained by explaining the existence of mineral waters by the infiltration of rain water which becomes warm in penetrating the depths of the earth

and comes back to the surface impregnated with properties derived from the rocks through which they have passed. But in this particular case, we should have to examine the Cevennes mountains, to find the beginning of this infiltration, but as in Vichy the earth is ground down in the interior from the moſt violent volcanic commotion, it seems to us better to confine ourselves to the theory of emanations, and the simpleſt thing happens to be the moſt truthful, since according to the valuable observations of M. Bouquet, the Vichy waters contain, with regard to potash, a proportion of soda, four or five times greater than that of volcanic rocks. Now rocks, when in a moſt perfect state of fusion, cannot give to water, a quantity of soda which they do not possess. Moreover in science, the shorteſt line is invariably always the beſt. The thermal mineral springs of Vichy, situated in a low country, offer a different character from those of mountainous countries such as the Alps, the Pyrenees, and Mont-Dore. In the latter the

waters spring out of the primitive rocks on a level with the ground, and this circumſtance makes their volcanic origin more certain. At Vichy, on the contrary, the Celeſtins ſpring alone offers a ſimilar character, and comes out directly from a cryſtalline rock. In all the others, the orifice of the ascending chimney, inſtead of opening on the ſlope of the mountains, opens at their base. They flow at the bottom of the valley, or of that funnel which we described, below the alluvial grounds, which they have no doubt contributed to form, and which they are obliged to go through in order to reach the ſurface. This ſtate changes nothing with regard to their origin or their compoſition, but it may influence their temperature by lowering it.

M. Dufresnoy conſiders the lower layers of argillaceous ſoil " as a kind of ſponge which " receives the waters of the ascending chimney " and carries them to the ſurface, either by " natural artesian wells, as in the Puits-Carré, " or by tubular openings made in the central

" mass by means of borings." Without wishing to contradict an opinion so well supported, we shall only remark, that it appears to juſtify a great number of visitors in thinking, that they cannot come to Vichy in September, because the rain water being mixed with the mineral waters, makes them cold and turbid: such an idea is erroneous, in our opinion.

The Vichy springs take nothing from the alluvial soil which they go through. *They receive no portion of rain water, with which they have* no contact. And their temperature is secured from all external influence.

In leaving the cryſtalline rocks, they enter into argillaceous soil which is porous, but in their passage, they deposit a portion of their properties *which becomes incruſted around them*, so as to make for them, an additional chimney which isolates them and protects them from all mixture. In this state, it may happen, they only reach the surface after taking a very oblique direction, some of them may even lose themselves as it were, and go

through many windings before they reach the surface or are brought to it by boring, and those will be the cooleſt, but the reader who knows how abundant they are, will easily underſtand, that if they flowed out without those protecting canals and " as in a sponge " in the alluvial soil, the sponge would have been long since saturated, and the Vichy valley would be only an immense marsh.

§ III

PHYSICAL PROPERTIES AND CHEMICAL COMPOSITION OF THE VICHY WATERS.

All the Vichy waters, from whatever spring they may be taken, are alike in aspect and taſte, the only physical difference being in their temperature. They are clear, semi-limpid, and effervescent. In a glass a quantity of bubbles of carbonic acid escape from them, and cling to the sides or ascend to the surface. It is to this carbonic acid, they owe the property of reſtoring faded roses,

which phenomenon astonished M^me^ de Sevigné, and in scarcely a lesser degree, her physician, an amiable man for whom she had much affection because he was amusing, and who could not explain it to her. The Vichy waters have a slightly acid taste, with however an odour and somewhat nauseous savour, owing especially to their temperature. Those of the Chomel and Lucas springs, and of the Lardy and Parc wells have moreover a slight smell of addled eggs which they lose soon after their extraction. As to the other wells, this smell, due to the presence of sulphuretted hydrogen, is only remarked, in the vicinity of the spas. But in all of them, if you plunge a silver vessel or article of any kind, you will find it blackened, on being taken out, which is a sufficient proof of the presence of sulphuretted hydrogen in all of the springs.

Thus the unequal temperature of the different springs is the only real differenee to be observed in their physical properties. The waters of the Celestins are cold, the others are

more or less warm; those of the Parc are at 20° those of l'Hopital at 30°; Grande-Grille at 40° centigrade.

If this difference of temperature causes the patients to find the taste of the waters more or less agreable, the fact must be understood and admitted, but that is due to individual peculiarities, and cannot be discussed.

The same may be said of the chemical composition of all the waters, which is the same — at leaſt they all contain the same elements. The proportions vary in the different spas, but only in a slight degree : a little less soda in one, some milligrammes more of iron in others, are not worth taking into account.

Nevertheless, a physician at Vichy has proposed to base on these infinitely small data, a classification of the different spas. According to him, there are at Vichy the different spas, alkaline and chalybeate-alkaline and sulphureous, according to the relative importance of the fractions representing them in the analysis. The case appears to us at once puerile

and grave. But we think that science gains nothing by such divisions, and that these minute and exaggerated distinctions can have no other result than to throw confusion into the eſtablished classification, and complexity into the chemical inveſtigation of the waters, inſtead of simplifying it. There is no spa in France or in Europe, which cannot rigorously speaking be brought into one or other of the preceding classes. The whole secret of such a classification would conſiſt in changing the places of the words, saying for inſtance chalybeate, or sulphureous and alkaline, inſtead of alkaline and sulphureous. In this manner, the mineral waters of Forges and Spa, in which iron predominates; those in which sulphur is the principal element such as those of Cauterets, Luchon, Enghien and Baden, would be confounded in the same class as those of Vichy; and all would be confusion.

We do not wish however to exaggerate M. Durand-Fardel's ideas, and we are aware that the divisions proposed by him have a practical object, which is only to designate

the relative qualities of the Vichy spas. But admitting this, we may ſtill enquire if these qualities be sufficiently determined to conſtitute a chemical character, and if, knowing that, the Lucas and Chomel springs emit a very faint smell of sulphuretted hydrogen, we can then fairly consider them as a species, and attribute to them special therapeutic applications. Take three gold coins of equal weight, let a stain of ruſt fall on one, and a patch of sulphur on another, and return the three coins to circulation : for each coin, you will receive the same amount in small change.

We mean thereby that the pratical utility of the divisions introduced by M.r Durand-Fardel is not strictly demonstrated, for every day we are obliged to replace, even when they appear to be moſt required, the alkaline springs by the so called alkaline and chalybeate, and reciprocally, without losing thereby any of the advantages of the cure.

The waters of Vichy are pulery alkaline, having a base of carbonate of soda, of which

they contain about five grammes, per litre, and this chemical character, essential, predominant and belonging to all the springs, is the only one which science can take into account.

We do not mean to say that the predominant element in the composition of the waters is also the most active principle when employed. There is a distinction between chemical analysis serving to establish classifications, and therapeutic experience; and we are far from adopting the doctrines of the laboratory, according to which the bicarbonate of soda is the sovereign specific, and only agent in the mineral waters of Vichy.

The other principles, amounting together to one and a half gramme per litre, iron, and above all arsenic, and such elements as have not yet been detected by chemical analysis, would occupy our attention quite as much, if we endeavoured to discover the mysteries, and to determine the mode of action of the waters. We may add also carbonic acid of which we

say nothing, and of which moſt people perhaps should say more than they do, but of which we think much.

Carbonic acid is the vivifying principle of the waters, the agent of their immediate stimulus. Between the fresh waters (*eaux vivantes*) that is to say, those drunk at the spring, and those exported, there is no difference, but in the quantity of carbonic acid.

As to the springs called chalybeate, we muſt make a remark which is of some intereſt to the geologiſt: suppose that from the *jet d'eau* which was formerly at the extremity of the park at Vichy or from the new Casino built on its site, as a centre, you draw a radius ending at the fountain of the Celestins. With this radius, describe a circle, leaving the Lardy spring outside. You will thus circumscribe a narrow space corresponding to what we have called the old or small basin of Vichy. In this space are united the old springs, the real spas of Vichy, all purely alkaline, and not one of which is chalybeate. But if you add

one, two or more kilometres to the radius, you will enclose a considerable espace in which you will find the so called chalybeate springs: the Lardy well, near the extreme limit, the Mesdames spring, two kilometres distant from Vichy, the springs of Cusset, three kilometres; those of Hauterive at five; of Saint-Yorre at six; and those of Chateldon still further, at twenty kilometres distance.

According to the most recent analysis, two sorts of principles are contained in the Vichy waters: acids and alkalis. The former are *carbonic, hydrochloric, sulphuric, phosphoric, arsenious and silicicious acids.* The latter are soda, lime, potash, magnesia and protoxyde of iron.

None of those principles, except carbonic acid and silex occur in the free state. They are contained in different proportions forming various salts, which constitute the true chemical composition of the waters.

In reference to the analytical tables of M^r. Bouquet, placed at the end of this volume, and

to which we refer, the reader will observe that the greater number of these saline subſtances are due to various combinations of carbonic acid, and that the moſt abundant of all is, as we have ſtated above, the bicarbonate of soda. After this occur in far smaller proportions, but according to quantity, chloride of sodium, the bicarbonates of lime, potash, and magnesia; sulphate of soda, phosphate of soda, bicarbonate of iron, and laſtly arseniate of soda, in a proportion of two or three milligrammes per litre.

The percentage of the above salts is directly proportional to the quantity of elementary principles conſtituting them. Thus soda, which is found in combination, with all the acids, exiſts in the mineral waters, amounting to about 10 or 12 times as much as the per centage of lime: 25 or 30 times as that of magnesia; 15 times as that of potash, on the other hand, the proportion of carbonic acid is 12 to 15 times greater than that of hydrochloride; 25 to 30 times more than that of the sulphu-

ric; and 100 times that of the phosphoric acid.

Thus the predominance of carbonic acid and soda is the moſt remarkable feature in the composition of the Vichy waters.

We have previously referred, in speaking of the composition of these waters, to this large per centage of soda, as a proof of their volcanic origin. The great abundance of carbonic acid and its compounds, affords another argument in favour of the hypothesis. For it is only in mineral waters, due to emanations from the centre of the earth, especially when such emanations are found in the neighbourhood of extinct volcanoes, as in Auvergne, that carbonic acid plays so important a part. In that case, the volatised mineral elements being forced to pursue a longer and more difficult course, through fissures and internal caverns, half closed, become cold before reaching the surface, and would have a tendancy to deposit themselves in the earth, if the carbonic acid did not by exerting a permanent

chemical action on them, carry them, or to speak more correctly, push them outside. Thus the acid gas becomes the moſt active agent in the mineralisation of water. And this is so true, that in the Vichy waters preserved in bottles, when they have loſt a portion of the gas by evaporation and cooling, the combinations formed by the gas with the mineral subſtances are decomposed, and the leaſt soluble of them form a deposit on the sides and bottom of the glass. The same phenomenon is repeated round the basin of the different fountains, which are covered with cruſts of sub-carbonate of lime and iron, and is observed on a larger scale in the deposits formed around some of the springs; those of the Puits-Carré and the Celeſtins for instance.

This peculiarity justly occupied much attention when it became necessary to select a spring for bottling and exportation. The cooling of the water being one of the moſt active causes of evaporation of carbonic acid, the waters obtained at a low temperature were consi-

dered moſt likely to preserve their properties and consequently appeared the beſt for exportation. We shall ſtate, in treating of exported waters, what we think of the accuracy of this notion.

Besides the alkaline bicarbonates, there is in all the Vichy waters, a considerable excess of carbonic acid gas. It is this excess, which, escaping from the springs, produces the effervescence of the waters, and piquant zeſt to the taſte. We have mentioned the faculty they have of restoring roses, and that was discovered by Madame de Sevigné: " I wish ,, to state that you are in the wrong, in belie- ,, ving that the waters are black; black they ,, are not, warm they are. The Provençaux ,, would not like this beverage, but if you ,, place a plant or a flower in this boiling wa- ,, ter, it will come out of it, as fresh as when ,, first plucked; and far from burning the skin ,, or making it hard, it softens it. — Reason ,, on this. "

I do not know whether the fair bathers of

our days reason much on this, but they repeat the experiment and the phenomenon on themselves, and on the flowers which are offered to them in profusion at Vichy.

In the hotels, the process is applied to fresh vegetables. They are plunged, when cooked, into mineral water fresh from the spring, and are there by vivified, and made verdant again.

The Vichy waters contain a few other substances which need only be mentioned, either because they are only found in very small proportions, or because their existence is not yet sufficiently ascertained; for instance, iodine, detected by M. O. Henri, though M. Bouquet has failed to discover any. Some chemists have found traces of nitrogen, lithine and manganese. Prunelle mentions *sulfuraire* discovered by him around the Lucas spring. As to the vegetal organic matter, collected in green layers at the surface of the springs, and especially that of l'Hopital, so often referred to in the discourses and writings of some physicians, every one knows that it is formed in all

waters, ordinary water as well as in spas : in fresh and in sea water; and that it is never found except under the double influence of air and light. The Vichy waters preserved in hermetically sealed bottles never contain traces of it; it is therefore an open question, whether the waters really contain it; or whether its germs are deposited by the atmosphere. However, it is only juſt perceptible in the Vichy springs; it is as the 20/000th part of what is called a shade of milk in a cup of tea.

To close this chemical investigation, we shall add that the quantity of salts supplied by all the Vichy spas together is almoſt beyond conception. M. Bouquet has valued it at 5,102 kilogrammes daily or 1,861,230 yearly. It would be difficult to mention many localities in Europe enjoying such an accumulation of wealth in the shape of mineral waters. This fact explains in a great measure the increasing favour enjoyed by the spas of Vichy, and is at the same time a guarantee of the future. Because one of the firſt elements

of prosperity, in a thermal establishment, is the abundance of its mineral waters, which admits the greateſt possible number of invalids to the benefits of a cure, and regulates the requirements of the treatment for all of them.

CHAPTER THE SECOND

THE VICHY SPRINGS.

After this general sketch of the Vichy waters, we muſt examine each of the springs separately, so as to shew their different properties and therapeutic uses. We adopt, for this examination, the order which seems the beſt and moſt simple, that of *natural* springs, and *artificial* springs. This division besides depends on certain important considerations belonging to the physical and chemical composition of the waters. Thus the natural springs, at leaſt, the old ones of Vichy, are all warmer and more copious, the Celeſtins spring excepted, than artificial springs. They are more mineralised; less chalybeate; and

more purely alkaline. On the other hand, the artificial springs, while less impregnated with mineral properties, contain more carbonic acid in a free state than the natural springs.

We shall have to return to these considerations, forming so many general rules, which we shall add to some others, and place them under the little of *Axioms,* at the end of this work. The reader will thereby have in a small space the solution of the principal queſtions bearing on the Vichy waters and their use.

§ I.

NATURAL SPRINGS — THE GRANDE-GRILLE.

The Grande-Grille is perhaps the spring beſt known in the Vichy valley, at leaſt no other, except the Celeſtins, can compete with it in reputation. It takes its name from a large iron railing which formerly surrounded it, and which has disappeared in the recent changes made. It was at the same time sheltered by a large pavilion which has likewise disappeared.

It is situated in the large thermal eſtablishment, in the north eaſt angle, at one of the extremities of the gallery leading to the springs. The *buvette* is placed in a small hollow space surrounded by a railing which serves as a baluſtrade. It is reached by a small staircase with only two steps.

Of all the Vichy springs, the Grande-Grille is the moſt suitably placed. It is the one beſt representing to the mind a flowing thermal spring. In the centre of a basin of ordinary size, the water rises and bubbles forth, throwing up frothy spray to the height of half a metre. Its jet, perfectly isochrone, seems to result from a double interior source, the one a little weaker than the other, and acting regularly every second, with almoſt the same sort of throbbing as that of the heart, to which it may be in some measure compared. Those visitors, who witness this phenomenon, seem to observe it with curiosity and pleasure.

It would certainly be an amusing sketch to give, if we wished to undertake it, the physio-

gnomy of the drinkers who flock round the Grande-Grille : a crowd of patients of all ranks, from youth to old age ; with pale and jaundiced complexions : some of them, being corpulent, seem to suffer little from slight congeſtions of the liver or abdominal viscera. Others, weakened, and injured by deep seated affections of the same organs, and bent down by long suffering, drag themselves along painfully, and stretch forth their emaciated hands to the woman filling out the glasses of water. In many person, paludial cachexia shows itself by the sallow colour and dry and greenish hue of the face. They may be seen strolling about the galleries of the springs with sunken frames, pensive and dejected.

All the invalids do not drink the same quantity, or with the same facility. Some drink off at one draught a large glass full, which they repeat several times, if not too often. Others, on the contrary, drink with difficulty, a half or quarter of a glass, and take the waters slowly by mouthfuls, and

with such repugnance as to show that the stomach cannot bear the waters. The moſt fortunate and moſt sensible are those who can drink those half glasses or quarter glasses merely, without the stomach being affected, and without repugnance.

The physician finds in this scene much to be observed and learned. And it is for that reason, when any of our non-resident medical brethren, sojourning for a time at Vichy, consult us on the properties and efficacy of the waters, we never fail to say to him — go to the springs, at the hour when the invalids take the waters, to the Grande-Grille for inſtance; there, the patients carry on their faces, the diagnosis of their complaints: it would suffice to observe and follow them during the treatment to be enabled to ascertain in one month only, more inſtructive facts than are contained in all the works published, and in all the clinical lectures on the subject.

The Grande-Grille has presented, since the beginning of this century, great variations in

its yield and temperature. About 40 years ago, it gave about 15,000 litres of water daily, at 38°5 centigrade, according to the analysis made by Messrs. Berthier and Paris, in 1820. In 1845, Messrs. François and Boulanger in measuring, found only from 6 to 7,000 litres and 32 degrees of temperature; and since then, the temperature and quantity of water have been decreasing constantly; the latter even fell to 3,400 litres in 1859.

It was then that the Government constructed important works around the *Grande-Grille,* under the direction of M. François, engineer. These works being intended to confine the spring, resulted in the lowering of the flow of the waters, and in freeing its entrance from calcareous incrustations which impeded the issue of the waters. From that time, its action was entirely modified. The water found a free outlet and flowed more abundantly, and the produce, together with the temperature of the spring, increased considerably.

At the present time, the *Grande-Grille* has two issues, one by day, the other by night. During the day, it springs out, as we have described, giving about 75,000 litres of water, specially reserved for the requirements of the *buvette.* Its issue at night is not seen by the public, and is situated lower down, at 3 metres, 20 below the surface of the ground of the gallery. At this level, the daily issue of the spring is more considerable and gives 96,000 litres. This latter supply is exclusively used in furnishing water to the baths of the Eſtablishment, and in exportation.

There is a remarkable fact in the successive variations of which we have spoken, namely, the conſtant and direct connection exiſting between the produce and temperature of the spring, so that when the former diminished, the latter becomes lower. When an increase takes place, the same thing occurs, and that connection exiſts in all the natural springs of Vichy.

It always happens with the same spring,

that its temperature has been observed to rise or fall according as the flow of water increases or lessens; so that when we look for the causes of the variation in the temperature of the different springs; no other reasons can be ascribed, than the abundance of their produce, and rapidity of their flow; the latter cause, evidently being connected with the former one. The more abundant the waters are, the more rapid is their flow, and less time they have to become cold. Thereby results, this proposition, which experience confirms, and which may be asserted in a general manner :

At Vichy, *the natural springs which are the moſt abundant are the warmeſt* and on the contrary, the warmeſt springs are always the moſt abundant.

The temperature of the *Grande-Grille* is 41 degrees centigrade. This is about the same as Desbrets attributed to it in 1777. M. Bouquet found, during the year 1855, 41 degrees 8, and we ourselves found in 1859, 41 degrees 2.

The waters of the Grande-Grille possess in a high degree all the qualities of the mineral waters of Vichy. Their high temperature gives them an insipid taſte which may be agreeable or otherwise according to the inclination of the drinkers, but to which one becomes soon accuſtomed. They communicate to the stomach, no irritating sensation, and we would say that they were mild, if we could define what the word means. At leaſt, we desire to say that the majority of the drinkers take them without difficulty and digeſt them easily. It is seldom that the invalid, whilſt taking them, experiences any of the phenomena consiſting of fullness and heaviness in the stomach, regurgitation or vomiting which are observed when the waters of the other springs are taken; and although former writers have said that they were the moſt calculated to act powerfully on the organs, we have been in the habit of prescribing them frequently at the commencement of the thermal treatment, with a view to enable invalids to bear the waters better.

These slightly stimulating properties are however explained by the high temperature of the spring, and by the quantity, relatively smaller, of carbonic acid in a free state contained in them. The excess of carbonic acid is not always a certain guarantee of an easy digeſtion of the waters. The irritation produced by it in weak or ailing stomachs renders the waters sometimes insupportable. Undoubtedly, it is beneficial that the waters should contain more or less of it, according to the condition of the invalids, but never too much, like every other good thing; and it is to be remarked, that at Vichy, the waters which are considered the lighteſt among the natural springs are those which possess the leaſt carbonic acid. When we speak of the Celeſtins spring, we shall have an excellent proof to offer in support of this statement, and we shall see how often miſtakes are made, from want of a little attention.

But there is a more general observation which we muſt make here, namely, that in al

the Vichy waters, the quantity of carbonic acid in a free state is in inverse proportion to the temperature. We have seen juſt now, that the abundance and temperature of the different natural springs are conſtantly in direct relation : here the contrary takes place, and the warmer the springs are, the less they contain of carbonic acid in a free state. The only exception to this rule, is the Lucas spring which is by far the moſt impregnated with carbonic acid, though it is not by any means the coldeſt, and as for the Celeſtins spring though it is cold, yet it does not contain as much as that of the *Hopital*.

The *buvette* of the Grande-Grille is the moſt frequented at Vichy. There are few of the invalids who do not drink there, before they finish their thermal season. The *Grande-Grille* spring is prescribed in almoſt all the complaints treated at Vichy : but it is ordered especially in congeſtions of the liver, and of the spleen; together with the inteſtinal ailments resulting from them : in paludal cache-

xia; jaundice; and hepatic colics.... This is a usual cuſtom which we follow also; and which may be considered as a precept in the medical practice of our confreres at Vichy. But if it were necessary to ascribe a motive for this peculiar therapeutic action attributed to the waters of the Grande-Grille, it would, we think, be a very difficult thing to accomplish. Not only for that, but for the qualities attributed to the other springs.

Upon this point, reasons deduced from chemical analysis, which are supposed to take such an exclusive and important part in the medical theories of Vichy, fail completely. All the waters being identically the same in their nature, it would be in vain to endeavour to find specific qualities in any of them.

The physical properties, that is the difference in heat of the several springs do not give any further solution; but an argument possessing only relative value and depending on the lesser or greater facility with which the patients bear the waters of any particular spring.

Otherwise, it would be necessary to say, that the same medicament given more or less warm would cure in the firſt case diseases of the liver, and in the second, diseases of the kidneys, a physiological and therapeutic statement made by some, but which is daily contradicted at Vichy.

Experience, we avow, is more conclusive. Observations have shewn that the different Vichy springs, according to the nature of the disease, possess a special action which render some more efficacious than others. For intance, the *Hopital* spring in gaſtritis and gaſtro-enteritis of a chronic kind : the *Celeſtins* spring in affections of the urinary organs and gout : and the *Grande-Grille* spring in diseases of the liver. In these laſt affections, M. Petit seems to have made cures of a wonderful nature. On his side, doctor Finot, army physician, has pointed out unhoped for results to be obtained from the use of the *Grande-Grille* spring in cases of paludal cachexia : African diarrhœas generally so

obſtinate and refractory : and we ourselves can state, that our observations made in 1859, whilſt we had the military hospital of Vichy, under our care, fully confirm the truth of those assertions.

Upon this fact reſulting from experience, may be based, the special reputation of the Vichy springs and the importance of which cannot be denied. But we muſt not thereby infer consequences too strictly, particularly, if it be examined into fully.

We have said that, every day, the physician at the waters is obliged to abandon what seems to be moſt efficacious, and in the course of treatment to replace one spring by another, and because he has to deal with a queſtion, the moſt important of all, the peculiar conſtitution of the patient. Of what real value is it that a complaint would be cured by the use of the *Hopital* or *Grande-Grille* spring, if the invalid cannot bear the water? We muſt certainly take into consideration what seems to be the beſt treatment, and follow it as well

as poſſible, but at the same time remembering, that it is only a secondary queſtion. The nature of the invalid, his conſtitution, peculiar susceptibility, in a word, — his physiological and pathological idiosyncracy, this should direct the physician in the choice of the spring, and induce him, almoſt always, to delay giving express directions to his patients until rigorous searches are made.

Thus it is, that thermal practice is not less difficult and important than the ordinary practice of medicine. It would indeed be too easy, were it sufficient to reply, the Grande-Grille spring should be used in liver disease; and the Celeſtins spring in vesical catarrh. In this matter, as in general therapeutics, each patient feels and suffers in his peculiar way, and that way should be the true guide to the treat- ment.

These principles are worth remembering even by those physicians accuſtomed to thermal practice. And in fixing the proper reſtrictions to the special therapeutic action of the

different springs, we believe that we are conferring a benefit on our confreres practising at a distance from the waters. It happens very often, that physicians, deceived by the specific reputation of the springs, the exact worth of which they have not a personal opportunity of ascertaining when sending their patients to Vichy, name also a particular spring which they should drink. Among even the most eminent of our medical brethren, several act in that manner. They will permit us to say that with all possible respect for them but with love of truth, they are sometimes mistaken. Thereby, the physician at the waters feels himself in an embarassing position, and the patient becomes discouraged and loses confidence; a fact which may have a bad effect on the results of the treatment, and lead to unjust accusations. This happens oftener still because a great number of invalids without consulting even their ordinary physician consider it strange, that the physician at the waters tries to cure them of a renal complaint by

means of the Grande-Grille spring, and of the jaundice by the Hopital spring.

It would then be desirable, considering the difficulty of fixing upon any particular spring, that our confreres of all nations should be moſt explicit in every thing concerning the invalid and the nature of his disease when communicating with the physicians at the waters, and leave to them the task of directing the thermal treatment. As to the invalids, they should know that the different Vichy springs fortunately can be replaced, one by another, and that it is often useful to use them alternately. A gouty patient moreover can profitably finish his thermal season and avow unblushingly that he did not drink the Celestins spring at all. Formerly, such an admission could scarcely be made, but times are changed.

The Puits-Carré was formerly called the fountain des Capucins. We have said that the water of this spring was the only one collected for the use of invalids in the ancient

" Maison du Roi. " At present, it is the moſt important by its copiousness, and consequently by its temperature, of all the Vichy springs. It is situated in the middle of the thermal Establishment, on the right, when entering the central gallery. A placard on the wall; and on the ground, an open square, surrounded by a railing, informed the visitors two years ago where the spring was, and that they should descend some steps, in order to see it. At present the placard has disappeared, the opening is closed, and they have in printed letters over it *Bureau d'inscription des Baigneurs;* and those baffled in their curioſity find nothing which indicates the existence and position of the spring.

At the time of the extensive works executed around the Grande-Grille, the arrangement of the Puits-Carré was considerably modified.

It had at that time two stands raised one above the other; one at the level of the ground, the other one metre and a half lower. At that

time also, the Puits-Carré had its ***buvette*** frequented by a large number of invalids. The buvette no longer remains. The two stands were joined together, and lowered to where the water flows out, 3 metres 25, below the ground of the gallery. Thus, as is always seen, when the level of the orifice of a spring is lowered, the supply of the Puits-Carré has become thereby very considerable. It may be reckoned at 200,000 litres daily.

This great quantity of water is used for the baths of the Establishment, and is not sufficient for the wants of the service. That ought not to be surprising, when we recollect that at certain periods of the thermal season when the influx of bathers is so great, the Administration delivers 3,000 baths daily. But it would be incorrect to conclude, with some invalids, that the baths of the Establishment are then not sufficiently mineralised. The Grande-Grille, the Lucas, and the Brosson springs, which unite with the Puits-Carré in supplying the baths, furnish a more than

sufficient quantity to meet all requirements. The temperature of the water of the Puits-Carré is 44° 5 centigrade.

PUITS-CHOMEL.

In 1775, Louis Chomel, ancien doyen of the Faculty of Paris, physician in ordinary to the King and Intendant of waters, happened to be at Vichy, during the construction of the Thermal Establishment. One of the workmen, engaged on the works raised up a stone by a blow of the pickaxe, and a thermal source sprang up.

Running to the spot, in great haste, Chomel took possession of the spring, and gave it his name. He was the American Vespuccio of that discovery. Situated originally at two or three metres distance from the Puits-Carré, the new spring had for a long time, existed in a separate state. Its daily supply in 1820 was 2,500 litres. But in late years the *Puits-Chomel* as it is also called, has been united to the Puits-Carré the two springs

now forming one : same supply, temperature and properties.

The spring Chomel occupies in the Establishment the centre of the north gallery, and has the form of a fountain of rather a large site. It contains a sort of pump which brings up the water from the depth of three metres below the surface. On reaching the surface, it escapes by a cock which can be turned at will and then the water falls into a small marble basin. When a drinker presents himself, the guardian of the *buvette* fills a glass and offers it to him who, upon drinking it, usually makes a wry face. This sign of repugnance is owing to the smell of sulphur of hydrogen which is very perceptible in the water of this spring and gives to it a disagreable taste. Consequently the drinking it cause frequently belchings, and nidorous risings in the stomach very unpleasant and distressing to some invalids. In those cases, it is good to allow the water to evaporate a few moments in the glass before drinking it.

This inconvenience apart, the water of the spring Chomel possesses highly marked anodyne properties which render it very valuable whenever the weakened state of the constitution or its irritability requires to be moderately excited; of all the Vichy waters, it is the one containing the least carbonic acid in a free state, without thereby becoming more heavy and difficult of digestion, and as on the other hand, it is the moſt mineralised, it can in many cases profitably replace the other springs, and serve different uses as a thermal medicine. Its high temperature ought also to be reckoned among the causes which justly gain for it, its reputation for mildness. Thus we see frequenting its buvette, very delicate persons, highly nervous, and of weak stomach, women especially and children.

But a specific reputation has been given to the source Chomel in affections of the respiratory organs which seems to us dubious. Physicians formerly asserted that it was very efficacious in pulmonary consumption, an

assertion, we believe, that none of our brethren at preſent would wish to defend. However recent works mention predisposition to tubercular disease, in the number of complaints specially to be treated by the Chomel spring, dyspnea, cough, pulmonary catarrh &c. It is likewise very true when a patient is attacked, during the mineral treatment, by cold or hoarseness, that he is sent to the same spring. But the difficulty probably would be, nevertheless, to give a well established case of an invalid who loſt his cold or recovered his voice by that means; and it is impossible for us to see in this practice aught but a trivial sacrifice to the odour of sulphur of hydrogen which is more remarkable in that spring than in any other. At leaſt we have never found in the Chomel spring, or in any of the Vichy springs, any special action, and scarcely an apparent one in diseases of the reſpiratory organs. We muſt be on our guard, we repeat, againſt those pretentious theories attempting to make out of each

kind of mineral water, a universal panacea. These theories compromise the reputation of the springs (which they trumpet forth) by their exaggeration, and they mislead greatly the invalids and our non-resident medical brethren. In the particular case, medication by the Vichy waters forms a treatment sufficiently powerful, not to have it applied to any other disease. As for us, this danger exists, at least as a counter indication, precisely in idiopathic affections of the respiratory organs, asthma, dyspnœa, in threatened or existing phthisis &c., it exists also in organic diseases of the heart.

We can formally, and in a most precise manner, state in two general propositions, what the experience of the majority of our confreres and our own clinical observations have taught us, as to the full power and efficacy of the Vichy waters. They ought not to be prescribed and are more dangerous than useful in all disease existing in organs situated *below* the diaphragm.

On the contrary, in affections of the organs situated *above* the diaphragm, they are useful, very effective and often bring about unexpected cures.

To this latter proposition, we should add certain diseases affecting the entire constitution and which, connected either as cause or effect, with a derangement of the organs of nutrition, appear to be most successfully treated by acting on the important organs. Gout chlorosis, diabetes, albuminuria, are in this way benefitted or cured by the use of the Vichy waters.

Now if a patient in the position we have just described, be at the same suffering from a pulmonary catarrh or a chronic inflammation of the throat or larynx : if with general debility there be a great delicacy of the respiratory organs : if a serious congestion of the liver bring on symptoms of oppression : if chlorosis be accompanied by shortness of breath and palpitation, it is evident that these secondary symptoms, some of which will dis-

appear with the principal disease, are not a counter indication to the thermal treatment. We can underſtand and we believe it to be very useful in such cases, that patients should drink the spring Chomel, but it is not because the water of the spring possesses specific properties; but it is because it is the leaſt exciting of the Vichy waters. And when a rather severe cold suddenly attacks the patient, the beſt thing is to suspend for some days the thermal treatment.

HOPITAL SPRING

The spring *Hôpital* owes its name to the position it occupies in old Vichy, in the centre of the square Rosalie, and in front of the civil hospital. It springs up in a large round stone basin, placed on four lines of steps and raised about two metres above the ground. An iron railing surrounds the edge of the basin and a roof with a belfry and supported by twelve small columns covers it. Constructed in this manner, the fountain *Hôpital* is not

wanting in elegance, nor in a certain pretension to art, which unfortunately as far as regards medical hydrology is not fully carried out. The roof was built with the excellent object of sheltering the mineral water from too much light, and preventing the formation of that green organic matter which appears, as we have said, especially in the water of this fountain.

But the basin is too large and too deep. The jet of the spring pressed down at its orifice exhausts itself under such a quantity of water it has to go through and reaches the surface with difficulty. The iron railing which surrounds the basin allows to pass through its bars, the clouds of dust which the wind brings and which takes from the water a part of its clearness. A most inconvenient thing is, that there are four steps mount before reaching the *buvette* and which are too narrow. In our opinion, a drinking fountain must be of easy access for those invalids prevented from walking with ease, by old age or illness.

The waters also muſt be taken at the spring itself and in all its purity and to have this done, it is still more important to have the springs sheltered from the air and from the light. We muſt however say, that the adminiſtration being informed of these circumſtances, an occupied in endearouring to place the spring Hopital, in a better position.

But they have been thinking of doing so for a long time!

The product of the *Hopital* spring is very irregular, and changeable in the different measurements that have been made of it.

It has given successively to M. François, engineer, 41,000, 69,000 and even 73,000 litres. It may be calculated on an average, at 60,000 litres every twenty four hours. The temperature of the water varies between 30 and 31 degrees centigrade. — We found it in 1859, at 30° 6.

The spring has only one regime, but it has a double service supplying the ***buvette*** and the hospital. It has about thirty bathing

cabinets. There is to be found the only piscina still existing at Vichy. It is supplied by the water of the spring, and for this object, from the bottom of the basin of the fountain, subterranean tubes communicate with the bath rooms, and with the douche cabinet of the Eſtablishment. The *Hopital* baths are very much esteemed by many patients, women particularly, appreciate them, and the piscina is specially reserved for them. They are generally considered to be milder than those of the *Puits-Carré*, but this may be simply vulgar prejudice which has come to be believed.

We merely state the fact.

This induces us to say a few words of the Piscine baths which the *Société d'Hydrologie* have praised highly but only as far as regards the aid they give to the public.

It cannot be denied that they have largely contributed to make a great economy in the quantity of the water, as well as of time, and of the hands employed on the premises; and

that they give assistance to a great number of patients. But when in weighing these considerations and others, those for instance which enable the invalids to take baths of long duration and to ensure useful exercise, people call anxiously for new piscinae at Vichy, we may be permitted to entertain doubts as well of the advantages of the means proposed, as of the object in view. All our confreres at Vichy, we know, do not agree with us on this subject, but however personal and isolated our opinion may be, it seems to be a juſt one and we do not hesitate in giving it. We muſt firſt observe that a large bathing reservoir useful perhaps in salt water or sulphurous water bathing establishments, would be of no use at Vichy, where the kind of diseases treated would allow patients to make use of them.

The usual kind of Piscinae should therefore only be employed.

A round shaped basin of middle size, with a seat in the interior, of usual dimensions, to which the patients could come and sit around.

But from the fact of their being assembled together, in a small space, we think the exercise they could have, would be very trifling, and the utmoſt difference between a piscina bath and an ordinary one, merely conſiſts in the difference of position, which is seated, or half upright, inſtead of being horizontal :

It is true that patients can rise, and remain standing in the piscine; let us even admit that they can walk if they chose; the truth is, that they make no use of these advantages which besides have many drawbacks ! The contact of people for whom we have an antipathy, not to say more; moral conſtraint; and the danger of wounding that bashful modeſty, peculiar to invalids, and what is ſtill a more serious inconvenience a temperature of the water which cannot suit all Bathers. On this account, the invalids pass their time, in general, in complaining and in suffering; some because the water is too hot; others because it is not hot enough.

No doubt our bathing apparatus is small,

wretched, and uncomfortable; but inſtead of endeavouring to ameliorate it, by building piscinae, would it not be better to begin by reforming the bathing machine itself? And it would be the more advantageous to do so, as patients in general make use of the private baths, and prefer them, and that it would be easy to make the bathing machines more convenient in general, and to appropriate them to the position required by certain diseases.

At Vichy, for inſtance, the patients moſt generally sent to the piscina, are women affected with diſeaſe of the uterus; well, we may ask what advantage there would be for them to be seated or standing, or to take exerciſe in bathing, and what satisfaction they can find in bathing in the same water!

As to the advantages of baths for a prolonged period of time, it is a queſtion in our mind, which would require to be studied again, before it can be solved.

As a principle, it seems to us that people forget a little too eaſily, that the faculty of

abſorption in the human body, has its extreme limits, which in general are attained at the end of an hour; after which time, with rare exceptions, the bath is only a cauſe of fatigue, and debility. For our part, we do not regret the piſcina which formerly exiſted in the great eſtablishment and which was in late years, filled up, and we regret it the less as we saw at the Hopital spring, sickly, weak, and emaciated women, remain daily, three, four, and even five hours in the water. — The immediate effect, of such a mode of treatment sometimes appeared to be beneficial, but it is the definitive reſult that should be ascertained, and people should have the courage to publish it.

The water of the *Hopital* spring taken as a drink, or in baths, has the reputation of being very mild, and patients drink it with pleaſure. It is in fact one of the leaſt exciting of the Vichy springs, and may be placed between the *Chomel* spring and the *Grande-Grille*. Its luke warm taſte has nothing diſagreable

in it, and after taking it neither nausea nor heat in the stomach affect the patient. Sometimes a slight intoxicating sensation is felt, after taking it, which is however remarked in all the waters of the Vichy springs.

However the waters are of the Hopital spring are not always digeſted easily, and a good many patients are to be found who cannot support them. In these cases, they cause a heavy feeling in the epigaſtric region, flatulency and diarrhœa, and that explains the opinion of the physicians in paſt times, who considered them as the moſt purgative of the Vichy waters.

This difficulty in digeſting them is attributed principally to the organic matter which this spring contains; it was also stated that this large quantity of organic matter, gave it peculiar balsamic properties; but, in reality, the quantity it contains was never well ascertained, so that it is rather difficult to form an opinion on the subject.

The theory of exciting properties, which plays such an important part at Vichy, ex-

plains the fact, by affirming that the water of the Hopital spring, does not stimulate sufficiently the stomach; other theories maintain on the contrary that it possesses digeſtive qualities of a moſt remarkable nature, and recommend it to be taken after meals in lieu of coffee; all that may be true, but in our own perſonal practice and obſervation, we found that it sufficed to diminish the *dose* or to give it mixed with water or Syrop of Gum, to make it be digeſted, and we are inclined to attribute the not unfrequent caſes in which, the waters of the spring Hopital cannot be supported, only to the quantity of the water prescribed and taken, and to the bad state of the digeſtive organs, of the generality of the patients who frequent it.

Nearly all thoſe invalids have the mucous membrane of the digeſtive tube in an irritable state and more or less affected by long sufferings.

It is to this spring that patients are sent who are affected with diseases of the digeſtive

organs, dyspepsia, gastralgy, gastritis, chronic gastro-enteritis, obstinate diarrhœa, and dysentery; affections which act on the nutritive system and bring on by degrees debility and increased irritability of the system or a state of prostration and all the symptoms of decay.

In these different cases, the water of the Hopital spring on account of its anodyne qualities, and from its not being too stimulating in its effects, is unquestionably most useful.

We have seen it in a few days stop diarrhœa of long standing and bring on a healthy state of the digestive organs. — But from the fact itself, that the mineral water acts directly and powerfully on diseased organs, it is essential to watch carefully over its effects and to prescribe it only in *very small doses*.

The treatment by the waters of the *Hopital* spring, is particularly useful to literary men, whose digestive functions are frequently deranged from excess of mental labour.

They should be recommended to women and to fashionable young men, who by the excess of pleasure find themselves in the same position. Unfortunately in these cases, the diesase and not the cauſe can be cured, and the majority of these patients, only recover their strength to lose it again.

Conſtant viſitors they are!

We could say the same of a great many of the visitors who owe to their irregular habits the cause of their complaints, and who do not appear to underſtand that the waters whilſt certainly calming their sufferings cannot cure them of a chronic malady in the absence of a good and perſevering hygienic regime.

Women suffering from tumours, congestions, catarrhs, or other disease of the uterus, commence their treatment and very often end it, by drinking of the *Hopital* spring, the special action of which in such cases is generally admitted. It is moreover easy to understand that diseases of the womb almoſt always accompany serious derangements of the sto-

mach and intestines, and a great change in the general health. Thus we see commonly, among such invalids, that the improvement begins by the reeſtablishment of the functions of digeſtion, and the gradual return of strength. As to the symptoms peculiar to the disease, they are slower in disappearing, and only yield, when they do yield, to the combined action of all the elements of thermal treatment, and to the prolonged care which would inſure its good effects. When we shall speak of diseases of the uterus, we will point out those which can be treated at Vichy, and such of them for which the waters would not be effective. In all these affections, time aids greatly the thermal treatment; and though speedy improvements, owing to the waters, often take place in the health of the invalids, yet they never can expect a permanent cure, until they have passed two or three seasons at Vichy.

CÉLESTINS SPRING.

A general miſtake is made relative to the Celeſtins spring, to which we have already called attention, and which we conſider muſt be firſt rectified. We mean with regard to the quantity of carbonic acid which it contains, and which is erroneouſly supposed to be much greater than in the other springs. There is no visitor under treatment at Vichy who does not share in this belief founded principally on the sharp and piquant taſte of the waters of the Celeſtins, but which is alſo sanctioned we muſt say, by some of our confreres who have given credit to the fact, without going to the trouble of themſelves verifying it. They have propagated it verbally and in writing. Dr Barthes supports public opinion in his book. "The water of the source Celeſtins, he says, "is the moſt fully impregnated with carbonic "acid". There is, we repeat, a miſtake in this matter, by judging from the taſte of the water, but that can be and ought to be dis-

cuſſed. The fact is, that if the water of the Celeſtins has a sharper taſte, it is simply becauſe it is cold, contrary to all the other natural springs which are thermal one. Chemical analysis moreover proves formally the fallacy of the firſt assertion, not only is the spring Celeſtins not the moſt fully impregnated with carbonic acid; but among natural springs which contain less of it, than artificial springs, it only ranks the fourth with regard to the proportion it contains, which in counting all the springs, gives it the ninth place. The only springs that follow the "Celeſtins" are thoſe of the *Grande-Grille, Puits-Carré,* and *Puits-Chomel,* and still more, it does not possess the quantity of carbonic acid which it ought to have according to the general law attributing a larger quantity to cold springs, so that with the temperature of 14 degrees, it is inferior for the quantity of gas contained in it, to the Hopital spring which is 30 degrees.

In combining thoſe different peculiarities perfectly well eſtablished by the analytic state-

ment, we can obſerve that the Celeſtins spring offers a permanent exception to the general law of the Vichy springs.

Being a natural spring, it ought to be a thermal one, and yet it is cold.

Being a cold source, it should contain a large quantity of carbonic acid, and it possesses only a quantity relatively very small.

The *Celeſtins* spring owes its name to a convent of Celeſtin monks which stood formerly in this place, and of which some broken walls still remain. It is situated behind old Vichy, on the banks of the Allier, and at the extremity of an enclosure which bears alſo the name of the convent to which it belonged. At that time, the *Celeſtin* waters and all the Vichy waters were to a certain degree the exclusive property of the monks. They had the monopoly of the sale, and drew large profits from it, but as in their hands the waters threatened to become a little too miraculous, the office of Intendant was created by

Henry the 4th in order to protect the waters, and remedy other abuſes.

Lassonne informs us that in the laſt century, the Allier paſſed quite cloſe to the edge of the spring, and inundated it periodically when the river was flooded. At present, the position is not the same. The Allier was turned aside from its channel and diverted to a proper diſtance. Its channel was deepened, and a large quay raised on its former bed, which shelters the spring from further encroachments. It was nevertheless submerged these late years for several days, during the thermal season, at the time of the great inundations which deluged France, but in ordinary years this accident is not to be feared. The presence of the Emperor at Vichy by stimulating and bringing to a close the conſtruction of dykes made this spring perfectly secure.

The Allier driven back to a still greater diſtance, and henceforth kept within bounds in a single channel, flows on regularly and without any possible deviation. A park laid

out in the English style carefully designed, and planted on the earthen banks of the new dyke, shelters the spring from its floods.

The *Celeſtins* spring gushes directly out of a rock being an enormous mass of aragonite which it has slowly formed by successive deposits. A large square reservoir cut out of the stone, receives the waters, at their discharge, and a kind of pump brings them to the level of the surface. At a few yards from the spring, a ruſtic rotunda was raised which communicates with the *buvette* by a covered gallery. Near at hand, there is a pavilion where persons can converse, play billiards, and read the papers; a small garden situated in front of the spring, and at the foot of the rock which threatens them from above, enables the invalids to take a walk. I leave to future generations to speak of the marvellous shades of the park which mask at present the site of the river, and which prolonged round Vichy form a semi-circular belt. The shrubs will require time to grow, and it must be said,

they dont grow faſt. The visitor has (or had) the Allier and a landscape in which nothing was wanting. Fishermen, laundresses, white linen, peasants at work, ploughed fields, meadows, oxen and large mountains in the back ground. The fishermen, laundresses, and the white linen have disappeared, but the high mountains remain and suffice to make the spot preserve its character which is both agreeable and picturesque. For this reason, the drinkers made it their favourite rendez-vous.

From an early hour in the morning may be seen those who follow the treatment at that spring. They firſt drink a large glass of water — an old practice — they then take up their position in the rotunda, light cigars, and conversation begins in the open air; a free conversation, and at times, unreſtrained, like that of children and invalids, a bitter one, indiscreet, and sarcaſtic, consiſting of local topics, and as Guy-Patin said of gouty patients: "when they do not suffer, they are to

be feared". In the evening, drinkers of every degree turn their steps towards the *Celeſtins* with the object of promenading and amusement. They invade the sheds of the small dealers lining the road, and amuse themselves particularly, by playing with the "Dutch top", the monotonous buzz of which can be heard along the entire road.

It is well known, that the Celeſtins spring has contributed more than any other to the reputation of the Vichy waters. It was around the "buvette" of the Celeſtins, that persons formerly defended with great eagerness and demon-like thirſt certain medical theories on the cure of gout and stone: terrible discussions in which the combatants staked their lives, as M. Jourdain made prose, without knowing that they were doing so.

It was the time when a large number of the drinkers, unable to calculate from memory, the quantity of water drank daily, used to place in their pockets, after each glass, a small pebble to mark it. At present, that

ſever is not so ardent, though there still remain at Vichy many imprudent or ill advised patients, but the reputation of the Celeſtins remains intact. It will outlive the spring itself which is daily exhauſting itself and is likely to disappear.

The supply from the Celeſtins source is insignificant in comparison with those of the other Vichy sources. In 1820, it was 500 litres every 24 hours : later, in 1843, it fell to 350. Works undertaken at that time with much art and skill by M. Francois, engineer, brought the supply of water back to the former figure, but it has decreased and is decreasing progressively to 300, 200, and 150 litres. Even sometimes, in summer, during the great heats, no water is available, and the place is shut up during the afternoon. Its jet is at all times extremely slow and comes out with great difficulty through a narrow orifice, a thing to be regretted as it favours the formation of incruſtations, partly stops up the opening and more effectually

prevents the flowing of the water. Unfortunately the position of the spring in the centre of a rock makes it impossible to remedy this state of things, left the orifice might be closed entirely owing to the slighteſt derangement. The Celeſtins source is doomed to be exhauſted slowly, and that should be regretted, were it not that the new source lately discovered, moſt fortunately replaces it and takes its name.

The temperature of the Celeſtins water naturally low, decreases in heat from the slow movement of its jet. We have already stated that the more rapid the jet of the spring is, the less time the water has to grow cold and the warmer it becomes. This temperature is at the same time moſt irregular, to such a degree, according to the experiments of M. François, that it varies between 8 and 22 degrees centigrade. This difference is explained however to a certain extent and is partly caused by the stay, more or less prolonged, of the water in the reservoir which receives it.

M. Bouquet found it 14 degrees, which is the figure we have given, and which appears to us to be its normal temperature. This is chiefly the cause of the various qualities which diſtinguish the Celeſtin waters. When cold, it is palatable, in proportion as the heat of the air is greater : carbonic acid escapes more easily and with little noise the water is effervescent, moſt agreeable to the taſte, and very much relished by the drinkers.

We may add also on what does the success of medical theories depend! If M. Petit had taken his method of drinking immoderately, in the treatment of gout, to any other spring but that of the Celeſtins, it is probable that it would not be successful, and that the drinkers, disguſted by the taſte, would have shown less ardour and more temperance.

Those who chiefly frequent the Celeſtins spring, exclusive of gouty patients, are invalids affected by gravel, renal colics, and chronic affections of the urinary organs. Generally, in those patients, the organs of digeſtion are

perfectly sound, and the greater number of gouty patients together with those suffering from gravel especially digeſt the water easily, even when taken immoderately. The water of the Celeſtins is nevertheless highly stimulating, and its slow temperature contributes greatly to make it such, so that if any weakness exiſt in the organs of digeſtion or in the conſtitution of the patients, its use becomes difficult and even dangerous.

Its particular effect is to cause easily symptoms of congeſtion in the head, cephalalgia, giddiness, beating of the temples and weakness of the sight. It is necessary to be moſt guarded againſt those encephalic accidents which often appear with moſt serious symptoms.

There is another effect of the Celestins waters, more common and more marked than the preceding, which acts directly on the urinary organs and irritates them. So, that if in cases of gout or slight and atonic gravel, they can be used without inconvenience, provided the state of the conſtitution presents no

counter-indication, provided above all that they are taken in small doses from the beginning of the treatment, it is not the same in cases of affections of the kidneys and bladder. A great risk would be incurred of bringing on an acute affection with an increase of pains during the disease.

Among twelve patients affected with vesical catarrh whom we treated at the military hospital of Vichy, not one could take the Celeſtin waters from the beginning. All had symptoms of relapse; acute pains in the proſtate gland: pain in passing water; urine purulent or charged with blood which obliged us to have recourse for a certain time to the waters of the *Hôpital* and *Grande-Grille*. Five patients affected with calculous nephritis had a similar return of the different symptoms. In the case of three patients in the town affected with gravel, we observed pains in the lombar region together with nephritic symptoms and diarrhæa. In the case of another patient who had two years previously an attack of renal

colic followed by the discharge of a small ſtone, the tattack threatened to reappear and was prevented only by the ceſſation of the treatment. It is proper here to remember the ſerious remark of Prunelle "The Celeſtins water in many cases causes renal colics to diſappear, but it brings them on more frequently." All our experience and the reſult of our obſervations induces us to acknowledge the juſtice of that remark.

It is therefore moſt important, without denying the ſalutary action of the Celeſtins water, to watch attentively its effects and preſcribe it with great reſerve. We muſt alſo remark that the different effects of which we have ſpoken and which the water cauſes, generally ceaſe when the uſe of the water is given up; or do not again appear if care be taken to prepare the patient by the uſe of waters of a ſpring, leſs exciting in its nature. The *Grande-Grille* or the water of the *Hópital* is calculated particularly to accompliſh this; and we do not fear to give as a general

rule and a beneficial one; that all patients affected with diseases of the urinary organs should begin by either of those two latter springs.

In any case however, the water of the Celestins, owing to its stimulating and vigorous qualities, should be given in very small quantities. This is the best method to insure its efficacy and prevent all bad effects. It is a singular fact, that of all the Vichy springs, the one that should be taken with the greatest precaution and in the smallest doses, is the one of which so much abuse was and even still is made! It is a fatal error, the immediate danger of which is not always apparent, but which at a latter period is made evident at the expense of the patients. Experience has long proved this truth, to which it is useful to call the earnest attention of the visitors to the waters.

NEW SOURCE OF THE CÉLESTINS.

The spring now called "Nouvelle des Céleſtins" is the third to which that name has been given and the one which seems deſtined to retain it. The firſt was discovered some years ago, at about ten mètres from the former spring, and was on its appearance recieved moſt favourably. It was weighed and analysed, and the chemical ſtatiſtics in M. Bouquet's report refer to it.

But it was soon perceived, that what had been taken for a spring, was only the result of infiltrated water spread over a large surface; and which was not long in issuing forth from another point, in a much larger volume of water. This was the second spring called "Nouvelle des Celeſtins" the conſtruction of which was entruſted to M. Pigeon, the engineer.

The firſt care of M. Pigeon was to follow up energetically the infiltration of the water, and to stop only when he had discovered the

spring itself. He made that discovery in April 1858. Since that time, he devoted his time and talents to it; he placed it in a sort of sanctuary, at the bottom of an artificial grotto, which is a marvellous effort of taste and boldness. But as people who discover a spring have the same right to expect the injustice of men, as those who discover a world, M. Pigeon remains the Christopher Columbus of the third spring, "Nouvelle des Celestins".

It is situated in the same place as the former spring, in the same rock. The water which is seen to rise to the level of the ground is received in a little shell carved in the stone, and escapes by subterranean channels. Persons reach the drinking spring, through a long hall slightly sloping and appearing to increase in size in the dusky light before the grotto. M. Lefaure, government architect, raised the building in the form of a gothic portico, pierced with large glass arcades, in perfect harmony with the appearance of the landscape outside. The bluish colour of the

glass however, appears defective, though it was chosen in order to increase the dusky light and make the grotto appear deeper. "The exterior is ungraceful, said a gouty "patient, juſt as much so, as blue spectacles "on a human face". We shall add, in a more serious manner, that it weighs heavily on the heads of the invalids, and gives them the vertigo. In every other portion of the premises, we muſt do juſtice to the adminiſtration that has neglected nothing to make this spring convenient, agreeable, and worthy of the site that it occupies.

We have very little to say on the waters of the new spring, which have not yet been analysed. Its produce, according to M. Pigeon's statement, appears to be about 7,000 litres a day. As for its use, it seems deſtined to replace that of the former spring. We muſt not however suppose that the physical properties and chemical composition of the new source are equal to those of the former. It resembles it no doubt, as all the Vichy

waters resemble each other, except however that it springs from the same rock, and that is the best reason for explaining the analogy which has been attributed to it. The former drinkers moreover were not deceived, and during the five years that it has been opened, all remained faithful to the first *buvette* whose waters are more agreeable, without any after flavour of ink, and slake the thirst much better. We mention this fact without guaranteeing its authenticity.

The water of the *new spring of the Célestins* on the contrary, appears to us to have this advantage over the former one, that it is much less exciting. We did not remark in it the same action, equally powerful, on the urinary organs, nor a tendency to cause encephalic symptoms which we have just mentioned as a matter requiring great prudence. It may, we believe, be prescribed effectively in the beginning of the treatment. It is very light, and invalids digest it easily. Its temperature is higher than that of the former one

and appears to contain more iron, if we are to judge by the ochreous depoſit left on the edge of the spring. But we only give here an approximate and probable calculation; it remains for chemical analysis to give us the real compoſition of the water; and for clinical experience to determine its particular therapeutic properties.

LUCAS SPRING.

The spring Lucas, which takes its name from one of the late inspectors, takes also sometimes, the name of another spring called *Acacias*, which was formerly separated from it, but which has been joined to it. It is situated, opposite the military hospital about 150 metres to the eaſt of the great Thermal eſtablishment. The point from which the waters rise lies 7 or 8 metres deep in the earth. It is necessary to descend by a ſtraight ſtaircase into a dark cavern, in which a large set of pumps are at work, which take the water at its issue, and convey it into the reservoirs

of the eſtablishment. Another pump of smaller dimensions serves to bring up the water perpendicularly for the wants of the *buvette* to a metre above ground. There, it jets up by means of a cock in a small ſtone basin, from which it falls through a tube into the original reservoir.

Conſtructed in this manner, the source Lucas has a very humble aspect. The small pump which belongs to it is shut up in a sort of sentry box scarcely large enough to hold it, on the front of which, the name of the spring is inscribed in black letters. In the immediate precincts, no shelter exiſts for the drinkers who are obliged to take their glasses of water, and move away as quickly as possible, in order to avoid the burning heat of the sun. It is true that this arrangement, the sentry box included, is only temporary; but that is perhaps what is moſt hurtful, because it is moſt likely to laſt a long time, and it has in fact laſted long. Let us be truthful nevertheless, and say how matters ſtand at present. The sentry box has

been removed, the pump and *burette* likewise. Three things in fact have been done away with entirely, after which nothing remains except the patients. No one now drinks from the source Lucas, and a large flag ſtone has been laid on the opening of the spring.

The daily produce of the Lucas spring presented at different times great irregularity, and it is not the same when measured on a level with the well or at the orifice of the spring. In 1851, M. Dufresnoy, inspector general of mines, found at the orifice 81,270 litres, and only 22,700 at the surface. Some measurements executed later, but probably not correctly made, carried on the produce from 200 to 300,000 litres. At present the spring gives the usual rate of aspiration for large pumps — 86,000 litres.

This large quantity of water is used almoſt exclusively to supply the " baignoires " of the thermal eſtablishment. In consequence of a late arrangement, the source *Lucas* supplies, together with that of the *Puits-Carré*, the

wants of the military hospital, the bathing eſtablishment of which has juſt been finished.

The water of the spring Lucas, according to M. Bouquet, has a temperature of 29 degrees centigrade. It gave us 29°,8. It has on certain days a moſt characteriſtic smell of sulphureous hydrogen, moſt marked, but which promptly evaporates. It suffices even to hold a glass in the hand for half a minute, before drinking it, to prevent it from having any taſte of it. Its taſte is slightly mawkish, less so however than that of the different Vichy springs, and that no doubt depends upon the great quantity of carbonic acid which it contains. In this respect, the source Lucas presents an exception contrary to that of the Celeſtins.

In examining the analytical ſtatiſtics, we see that its proportions of gas are superior by more than half to those of the natural springs, from the abundance of its mineral properties, a two fold circumſtance which makes it in every respect the richeſt, and in some manner the prototype of the Vichy waters.

It does not appear to possess any special action in a therapeutic point of view, or at leaſt the researches made have not been sufficient to assign any to it. We however believe that on account of its mineral and gaseous properties, it is deſtined to render important services. We have used it with success in some cases of derangement of the inteſtinal tube (in which the waters of the *Hopital* spring could not be endured) and particularly in dyspepsia with diarrhœa resulting from typhus fever which had weakened the patient considerably. It possesses a remarkable aptitude in ſtimulating the action of digeſtion without causing vertigo. Consequently, it seems to us highly beneficial in all cases, where the principal organs are rather disturbed than diseased; to people particularly disposed to excessive secretion of lymph; and when to great atony of the inteſtinal functions are joined, debility of conſtitution, and corpulence without firmness of the flesh.

In former times, the source Lucas was

plainly called at Vichy, "*la source des Galeux*" and certain experiments made by Prunelle give reason to suppose that it was not without reason. They muſt have found that it had the property of curing the itch, or at leaſt exercised a certain special action on diseases of the skin. Its smell of sulphuretted hydrogen was what perhaps gave rise to this opinion which however had nothing unreasonable in it, particularly when we consider the signal services rendered by the alkaline treatment daily in those affections. It is true that the experience of our professional brethren, and our own observations, do not confirm it absolutely. We muſt say however, that in the cases of some patients in the military hospital, suffering from dyspepsia, and presenting also different cutaneous eruptions, we saw a complete exfoliation of the skin.

A remarkable fact was furnished to in the case of a naval officer who brought back from the colonies, combined with dyspeptic gaſtralgia, a confluent eruption of puſtules which

covered the whole body and looked like syphilis; a well known disease, it appears, in warm climates, where it has received the name of *bourbouille*. At the end of the thermal treatment, the eruption had considerably diminished; the puſtules had disappeared; and the skin had recovered its normal appearance.

Let us also ſtate, that having ourselves made use personally of the *Lucas* waters during a fortnight, we observed in them a remarkable tendency to act on the skin and cause copious perspirations.

In taking into account these cases and in considering that the Vichy waters, besides their alkaline composition, contain a quantity of arseniate of soda, we are not far from admitting that there may be some truth in the opinion of former physicians. Among the diseases of the skin, there are many which depend more or less directly on an inteſtinal affection or unhealthy tendencies of the organs of digeſtion. It is chiefly in these cases, that

the water of the source Lucas appears to us would be usefully employed, and that when tested by experience, favourable results would ensue.

ARTIFICIAL SPRINGS

Let us sum up briefly some general observations already made.

The artificial springs of Vichy possess thermal properties only in a certain degree.

They are less mineralised and more gaseous than the natural springs.

Three among them are remarkable for containing a larger proportion of bi-carbonate of protoxyde of iron, which has obtained for them the name of chalybeate springs.

This proportion does not exceed a maximum of 0,027 per litre.

All the artificial springs are of recent date.

In 1844, the first boring was executed at Vichy by M. Brosson, which produced the Brosson well, or the source du Parc. After that, others were discovered, but as fears were

entertained, well founded or otherwise, that these new springs opened for the escape of the waters would diminish the produce of the old springs, a decree forbade the boring of artesian wells within a certain space.

PARC OR BROSSON SPRING.

The Brosson reservoir placed opposite, and a little to the right of the thermal eſtablishment, is only about 200 metres from the Puits-Carré. It was situated firſt upon a little ground contiguous to the Parc, and which has been since joined to it. At the same time, it received the name of the *Source du Parc*.

The boring which produced it was carried to a depth of 48 metres. When it reached that point, a considerable quantity of water gushed forth, the flow of which seemed at firſt to diminish the waters of the Puits-Carré. This circumſtance occasioned perhaps the exaggerated fears and discussions more or less well founded, that sprang up between the State and M. Brosson.

It is difficult in fact to understand how an artesian spring could affect natural ones, when it is known that the latter, in leaving the native rock and during all their passage through the alluvial ground which forms the Vichy valley, leave deposits of mineral matter which thicken in their passage and form an isolated channel. In order to injure them, the bore would have to pass precisely through this protecting tube; but in fact, from the works executed in the Puits-Carré, when they had lowered the mouth of the spring, and had taken away the concrete substance that obstructed it; the produce of this spring became more considerable than ever. On the other hand the Puits-Brosson which had flowed at first with so much abundance decreased considerably in quantity. and then became more or less intermittent : a condition which it still preserves, and which has now become permanent.

This last circumstance made it very difficult to measure the gauging of this spring. The

daily quantity which M. Radout calculated at 66,000 litres was eſtimated at only 48,500 litres by M. François, and these latter figures seem to be the correct ones. Its action is very irregular, and has no fixed rule between the time of the flow and its time of inaction. Sometimes for a space of 25 days, it has flowed on conſtantly; at other times it has ceased to flow during a similar period. However, according to the observations of M. Dufresnoy, its normal intermittence generally laſts from 45 to 55 minutes.

Every three quarters of an hour, or every hour, the waters spring up, accompanied by violent explosions, and preceded by an escape of a considerable quantity of gas. The water rises up afterwards and is precipitated by sudden jerks and as it were after repeated "*soufflements*". For the wants of the "buvette" a pump has been made which pours it out from the mouth of a long winding serpent like tube into a marble reservoir raised a metre and a half above the ground.

The fountain situated at the right side of the Park, is placed in an elegant pavilion, surrounded by a barrier forming a baluſtrade, and supported by wooden columns.

The waters of the Park spring are chiefly used for the bathing service of the establishment. They have a temperature of 22 or 23 centigrades and are noted as having a marked taſte of sulphureous hydrogen. Their ingredients resemble very much those of the old springs in their vicinity, except however that they contain a much larger quantity of carbonic acid. No particular therapeutic properties are attributed to them and few patients use them. However, some persons affected with sluggish action of the digeſtive organs, or atonic state of the inteſtines, use these waters: as well as persons whose bronchial tubes are more or less weakened from the effects of chronic irritation or catarrh, or who have traces of skin diseases on their lody. For our part, we have prescribed them more frequently of late years, and always

with favourable results. We believe that much may expected from and obtained by their use, and without any hesitation, we apply to the source *Parc*, all that we said with respect to therapeutic treatment of the source *Lucas*, with which moreover it has a great analogy, and nearly a perfect resemblance in composition and taste.

PUITS-LARDY

The Lardy well is situated on the site of the old convent, "Des Celestins", and owing to that circumstance, is called the spring of the *Enclos des Celestins*. In all Vichy, there is no more agreable or favourable position. On the summit of a rock, a large park planted with lofty trees, and fragrant shrubs with sandy walks, where the drinkers find at the same time an agreeable promenade, shelter from the heat of the sun, and a lovely prospect. It is a "succursale" of the large establishment but less noisy, more picturesque and favourable to retirement and friendly inter-

course. Invalids come here during the day to repose under the shade of lofty walnut trees, or sit, near to the spring, in kiosks conveniently prepared for the perusal of books and newspapers. In the evening, the alleys are lined with chairs, on which the drinkers of the waters breathe the fresh and pure air, and converse in groups, under a cloudless sky. We do not praise the "Enclos des Celeſtins" merely because every thing pleasing to the eye and senses is found there, but when nature disposes the mind to calm and quietness, that place contributes more efficaciously to reſtore the bodily health.

Thus however it is, that the moſt lovely and useful things pass away, and here we have a fine proof of eloquent prose written in vain! Since we firſt wrote the above lines, Lardy has disappeared. It was cut in the centre by a wide, and stony road, broad enough for carriages, and with white walls on each side. The spring on one side, is left alone, and isolated: on the other, the trees which

remain still, and the withered leaves of which spread gloom over the solitary alleys. Every thing picturesque and agreeable has alas disappeared! And that was done without need, without necessity, without object, except perhaps in view of the very unchriſtian one of being disagreeable to the public: vandalism and want of taſte!

The Puits-Lardy is the deepeſt of the artesian wells of Vichy. It extends 250 metres in depth, in the centre of the ground. From that great depth, the waters bring up a certain quantity of sand and gravel which the effervescing properties of carbonic acid throw up before it. The water mounts up by an ascending tube, and is poured out through a griffin, into a lava vase, which it covers with its ochreous deposits and sediment. In the beginning it was thrown up in a moderate quantity. Its daily produce was 20,000 litres, but in the following years, it decreased to 17,12, and 10,000 litres; and it produces at present only 7,000 litres.

The water of the Puits-Lardy has a temperature of 23° centigrade. It has a marked flavour of salt of iron and a hydro-sulphureous smell. Its action on the mucous membrane of the stomach is active and stimulating, and it is easily digested by invalids. But it often causes violent cephalalgia, and derangement of the nervous system, in proportion as it acts on the different pecularities of the constitution, for which reason it must be taken with precaution, and in small doses. Moreover we do not fear to repeat, that *small doses* should be given at all the Vichy springs, and if we insist upon this, it is because the evil consequences resulting from the thermal treatment have, as their principal cause, the immoderate use of the waters by the drinkers.

The patients who frequent the Lardy "buvette" are very numerous, and variously affected. In one of the kiosks near the spring, the owners resolved upon keeping a register for observations, which every one could see and consult, and upon which the drinkers

could write down the details of their diseases and treatment followed. In these observations, there is naturally great exaggeration : it is a perpetual hymn of incense to the goddess of the spring, sung in all languages, expressive of admiration and gratitude.

A great number of patients have abandoned the other springs, and if they are to be credited, the Lardy waters combine all the special properties attributed to the different springs of Vichy, and have alone the gift of curing. However, in taking into account, what is exaggerated, there will be found in the above mentioned regiſter of observations, much useful information quite in accordance with medical experience. What is there astonishing however in the fact, that a mineral water possessing a double reſtorative property, as well by the iron contained in sufficient quantity, and the stimulating action exercised on the mucous membrane of the inteſtines, should be of great efficacy in the larger number of chronic diseases generally accompanied by

inteſtinal derangements, insufficient nutritive functions, and an improverishment, more or less considerable of the blood?

The water of the source Lardy can advantageously replace, for a short time, what is called in the general practice of medicine, the analeptic treatment — bitters and iron. It is particularly beneficial in cases of chlorosis; amenorrhœa; debility following a great loss of blood; and in all cases where the conſtitution is weakened without any evident derangement, it suffices to stimulate the energy of the digeſtive functions so as to enable the patient to recover his entire strength.

Children, women, and young girls particularly use it, and among, the latter several English and fashionable ladies who appear to suffer from the fatigues of the "grand monde" and regret having loved too much fetes, and balls.

There are also invalids affected with inteſtinal derangements, without inflammation, who having begun the treatment at the source

Hopital, finished it, with great advantage to themselves, at the source Lardy. There are others, to whom it is still more useful to begin at once at this laſt spring, this is particularly to be remarked in cases of torpid dyspepsia.

One of the moſt inconteſtable and efficacious properties of the source Lardy is the salutary effect produced by it in cases of paludal cachexia (cachexie paludéenne) when it is drank combined with the waters of the *Grande-Grille.* We have tried it with numerous invalids at the military hospital, on whom fevers contracted in Africa had left deep seated traces, and whenever the state of the digeſtive organs permitted the use of the source *Lardy* or *Mesdames,* the thermal treatment succeeded much better, than if the patients had been left to the use of the Grande-Grille waters solely. Common sense as well as experience recommend this treatment.

If we admit in accordance with the lateſt physiological researches, that the spleen changes by its functions the white globules of

the blood into red, and that congeſtions of this organ, by obſtructing its functions, bring white globules into the blood as has been proved by pathological observations : it is evident that it muſt be very advantageous to bring about the two-fold strengthening action of which we spoke — of the salts of iron and the stimulating gaſtro-inteſtinal action.

PUITS DE MESDAMES.

It is situated at about 1500 mètres from Vichy, on the Cusset road, between that road and the left bank of Sichon, at the extremity of an alley of poplars called the alley of *Mesdames,* in honour of Madame Adelaïde and Madame Victoria, to whom the thermal springs owe their firſt improvements. Perforated by M. Brosson, a short time after the discovery of the Lardy spring, it was subsequently purchased by the " compagnie fermière " which brought its waters to Vichy.

For this object, at the opening of the ascending tube is a circular reservoir from which

the waters flow, and from which they escape, by a metal pipe. Above the reservoir, a hydraulic apparatus compresses with force the carbonic acid which has a tendency to escape, and drives it into the leading pipe with the waters which by their own powers of expansion contribute to carry it off. Thus are to be found as far as possible, the natural conditions of mineral springs which only reach the level of the earth, under the ascending pressure of carbonic acid : and the water by this same arrangement is less exposed to lose its mineral elements in the diſtance to be passed over in coming to Vichy.

The spring of *Mesdames* opens into the gallery of the springs of the Grand Establishment, on the side opposite that of the Grande-Grille. It is formed by two reservoirs of small dimensions placed one above the other and supported by masonry work. The lower reservoir is larger and of open shape and almoſt graceful in its form : but the upper one has all the proportions, shape, and disa-

greeable appearance of a kitchen pot. The bathing public do not fail to perceive it, and to laugh at this artiſtic singularity. It is in the latter, that the water is thrown up, and from which it is taken for the wants of the drinking eſtablishment. It then flows over and meets in the form of a cascade, covering over all the fountain with its reddish deposits.

I have left those lines as they were written in the former editions, as I did with the spring *Celeſtins,* because it seemed useful to me that in a book, the paſt could be compared with the present. By this means, we have a more exact point of comparison, to observe the changes, to appreciate the improvements, and measure progress. We muſt add that the adminiſtration has within this laſt year done away with this ungraceful fountain, and supplied its place by a large pewter shell raised on a stand about a metre in height, so as to give it the form of a champagne goblet. A small cup, placed in the centre

receives the firſt waters of the spring, and the sides of the shell, carefully kept clean and brushed, preserve no traces of the red deposit. It is only in drinking the spring that its chalybeate qualities can be recognised.

The supply from the spring calculated roughly is 15,000 litres daily: its temperature 16 degrees centigrade. Its water, though a little less impregnated with mineral subſtances, is almoſt analogous in composition to that of the Lardy spring. It has in common with it, large proportions of carbonic acid and iron. In the beginning, it seemed superior to it in this respect, but the chemical analysis of the water of *Mesdames* was made at the rise of the spring. We are inclined to believe that it loses some of its properties before reaching the Eſtablishment.

However carefully the hydraulic apparatus may have been conſtructed, it appears to us, as to M. Bouquet, very difficult to prevent the evaporation of carbonic acid. The metal pipe which brings the water, is in fact covered

for several metres of its extent, with a very thick layer of sediment, which is an undeniable proof of that evaporation and of a certain waſte of the salt of iron. This layer is particularly remarked at the end of the season, when the pumps have ceased operating. To ascertain with any certainty, the real composition of the spring *Mesdames,* it would be desirable, that the analysis should be made upon its firſt reaching the thermal Eſtablishment.

It has not however the sharp taſte that its great proportions of gas and its cold temperature ought to give it, nor does it possess the ferruginous flavour so much marked as that of the Lardy well. It is less stimulating than the latter, and does not so easily give rise to cephalagic and other nervous derangements, but it is perhaps more indigeſtible, and cannot be drank by a large number of patients. This however depends upon the peculiar conſtitution of the individual. It then weighs upon the stomach, like a stone, and when taken, it

is followed like all the other springs by flatulency, colic, and violent diarrhœa.

The therapeutic treatment of the waters of *Mesdames* is the same as that of the Lardy water, It is useful in the same diseases, and the same kind of patients frequent it. People vary according as to whether their particular ailments and the necessities of their conſtitutions, make either of the springs more beneficial to them. We have however sufficiently insiſted upon the fact, that the therapeutic application of the different springs of Vichy is above all a queſtion of physiological and pathological idiosyncracy.

PUITS D'HAUTERIVE.

The little village of Hauterive, situated on the left bank of the Allier, 5 kilometres diſtant from Vichy formerly possessed natural springs of which mention is made in old medical works. These springs ceased flowing for a long period, when, in 1844, M. Brosson discovered them anew by that perforation upon

their former site which gave rise to the present spring. It was a fortunate circumstance which made Hauterive a thermal station, near Vichy. A small Establishment, containing four baignoires, was constructed, with the hope of receiving patients : then the company bought the new spring which, with the rest of the establishment, became the property of the State.

The Hauterive spring is the third of the artesian chalybeate ones and by much the most important of the three, owing to its large sale. Confined in its origin, and having but one jet, it supplied daily 86,000 litres of water. At a later period, it was divided into two and furnished a new well at two or three metres distance from the first. Both have been known under the names of *Grande Source* and *Source de la Galerie*.

The Grande Source was then specially used in the fabrication of bicarbonate of soda. It sprang up in a close cavity intended to contain the great quantity of carbonic acid which

it furnishes, and by this means to render its fabrication easier. Its daily produce was 29.660 litres.

The spring "de la Galerie", the supply of which was only 24.000 litres, flowed into a little circular basin placed under the gallery or periftyle of the eftablishment, and was used exclusively for the exportation of the waters in bottles.

But recently the adminiftration set aside all this state of things, demolished the circular basin, and the gallery of the eftablishment. The two springs were united, and as in former times, there is now but one supplying the same quantity of water as formerly.

There is no "buvette" at Hauterive properly speaking, and patients only come there for a walk. In this case, they fill a glass and drink it on the spot; or fill bottles, which some of them like to do. The company had however an idea of bringing the waters of this spring to Vichy and the project would certainly have advantages, owing to their excellent composi-

tion : still, it is not perhaps to be regretted, as they might have loſt on their way, some of their ingredients. M. Durand-Fardel thinks they would be beſt calculated to replace the waters of the Celeſtins spring; though he does not however recognise in them any special action on the urinary organs; he praises much their digeſtive qualities, and the facility with which patients bear them; but it is evident that this refers only to waters which have been carried to a diſtance.

It can be affirmed with more exactitude that at Vichy, these waters would have the same results as those of Mesdames and Lardy; but the same objection still remains, which is; if water be carried a diſtance of five kilometres in pipes would it preserve the same properties it had at the source itself. We do not think so.

The waters of Hauterive are, of all those of Vichy, the moſt impregnated with carbonic acid. They are cold, between 14 and 15 degrees, and that double circumſtance, it is

said, makes them valuable for exportation in bottles.

PUITS DE VAISSE.

The perforated well of Vaisse exists only, at Vichy, as a natural phenomenon, very intereſting, and is very much frequented by invalids. It is situated in the little commune of Vaisse, on the left bank of the Allier, almoſt opposite to the thermal Eſtablishment. It is styled the Vaisse well, Pré-Salé, or intermittent spring. This laſt term serves to define its singular way of flowing.

The Vaisse well is diſtinguished, in fact, by a perfectly regular and curious intermittent action. Its jets are preceded by a subterranean noise, which increases as it comes near the surface, and are accompanied by a violent eruption of water and gas, strongly impregnated with the hydro-sulphureous odour. At this moment, the spring presents in miniature, the phenomenon of a hot water volcano. It flows in this way for six minutes, then the

sharp hissing noise is heard produced by an explosion of gas which announces the end of the eruption. In an instant afterwards, the spring gives neither water nor gas, and all is silent during 50 minutes. After that time, the phenomenon begins again in the same way.

A great amusement is created for the drinkers by inducing the new comers to lean over the openings at the time marked for the eruption. The latter are affected at once by the sharp effects of the sulphureous gas, and throw themselves backwards suddenly, their eyes and nose suffering acutely.

The *Moniteur Universel* of the 20th December 1865, contains a letter from the Revd. Father Girard, Apostolic Missionary, giving upon the thermal mineral waters of Atami, in Japan, most interesting details, some of which are found in this book. We read in them, an exact reproduction of the Vaisse spring, and a confirmation of our opinion on the volcanic origin of the Vichy waters.

" The waters of Atami are in the higheſt " degree saline and thermal. They escape " from an argillaceous soil, by an irregular " opening about the size of 30 square centi- " metres. The spring is situated at the foot " of high mountains of purely volcanic struc- " ture, above the village of Atami, and about " the diſtance of half a mile from the sea " shore. The waters spring up at intervals, " more or less regular, 6 or 8 times in the " 24 hours, and each eruption is accompanied " by a series of phenomena which are presen- " ted almoſt invariably in the same way. " This is the way in which things generally " go on. The subterranean noise constantly " heard above and in the environs of the open- " ing increases in intensity at a fixed moment, " and announces the immediate explosion " of jets of vapour, and a small quantity of " boiling water carried with them. The " noise increases gradually and seems to draw " near the surface of the earth : the jet of va- " pour at the same times increases, be-

" comes continuous, and soon dashes from " the opening in a vibrating volume of water, " the noise and impulsive force of which can " only be compared to the steam escaping " from the safety valve of a steam engine. " After 15 or 20 minutes, the maximum is " attained. Then the noise decreases, chan- " ges its nature; the volume of steam loses " its force; a little boiling water in ebullition " flows beneath it: the phenomena continue " to succeed each other in proportion as the " quantity of water diminishes; the boiling " water jet increases, and soon comes out of " the opening in a full flow, falling into the " neighbouring reservoir formed to receive it. " Soon after the water ceases to flow, and " all is quiet till the next eruption."

There is nothing more to be remarked relative to the Vaisse spring. Its supply of water is unknown: its temperature according to M. Bouquet is 27°8 centigrades, and its water is useless to invalids.

TABLE

Showing the temperature and volume of the different springs of Vichy (M. BOUQUET).

	Température.	Débit par 24 heures.
Puits-Carré	44°,7 centigr.	200,000 lit.
Puits-Chomel	44 ,7 —	... ... —
Grande-Grille	41 ,8 —	96,200 —
Hôpital	30 ,8 —	52,400 —
Lucas	29 ,2 —	86,400 -
Célestins	14 ,2 —	0,500 —
Puits-Lardy	23 ,8 —	7.000 —
Puits-Brosson ou du Parc	22 ,5 —	44,480 —
Puits de Mesdames	16 ,8 —	14,400 —
Puits d'Hauterive	..... —	53.996 —
Supply in 24 Hours		555,376 lit.

CHAPTER THE THIRD

I

ON THE DIFFERENT MODES OF TREATMENT BY THE THERMAL WATERS.

I now enter, under this heading, upon the moſt important queſtion relative to the use of the Vichy waters. The entire medical question, as far as thermal waters are concerned, reſts in its proper or improper solution. The chemical composition of the Vichy waters being ascertained, together with their properties and therapeutic treatment, that is to say, the diseases requiring their use and of which we shall speak hereafter. It is a matter of great importance, that patients, should know thoroughly the way of using them, and also,

that the physician should know how to prescribe and use them.

In other words, the mode of prescribing the waters consiſts simply in the advice to be given and followed in the treatment of disease by thermal waters.

The queſtion thus defined becomes exclusively a medical one, and the physician becomes the chief judge. But even as a matter of intereſt to the patients themselves, and in order to enlighten them, it seems useful to us to insiſt on the importance which it assumes in hydro-mineral medicine. This advantage is above all evident and inconteſtable, since the reform introduced in the management of thermal Eſtablishments in France.

The 15th article of the new regulations states that "the free use of the waters is open to "all, without being reſtricted to medical "advice, or permission of any kind".

In the firſt edition of this work, we opposed this notorious article, and condemned it for serious reasons. We proved that it was feeble

in its conception, puerile, and ill grounded, unreasonable, and dangerous, in its results; that it was a violation of the decree of 1846 relative to the distribution and sale of medicine; and that it denoted on the part of the men who had been its promoters, and of the Minister who had signed it, an excessive latitude given to individuals and professional men: a palpable forgetfulness of the usages of our mineral springs; a limited respect for the privileges and duties of medical science: and a wonderful contempt of the stimulating action of some mineral waters, and particularly those of Vichy, upon the constitution. Our opinion was unheeded, but we predicted that Vichy was about to become a field for exaggeration and deception, and since then we registered daily, accidents resulting from the abuse of the waters, and the use of the 15th article. A sad way indeed to gain ones cause by such arguments and particularly sad to have to plead it!

The blow inflicted on science was not a less

serious one, and we shall enter on the subject.

Thermal medicine, if I can thus call the entire treatment by mineral waters, is not yet eſtablished, in spite of the highly advantageous results and even unhoped for success which makes it precious, and secure its future favour. It has not yet been brought to any precise certainty in its effects. It possesses no fixed principles; no rules; no method in its use; and it would be in vain to look for, in the numerous works which it produced, anything further than mere suggeſtions. It is known, that the waters prescribed in certain diseases may or may not cure those who use them, but on that queſtion, it is impossible to reason fully, and it is above all difficult to eſtablish any scientific rule. We muſt remark, that all the observations, all the facts published on the subject without any other guarantee than that of individual authority, more or less impartial, present no other information and no other conclusion.

We return to the queſtion in order to eſtablish it and explain it more fully. The skill requisite to direct a patient and adminiſter opportunely a healing treatment, is moſt difficult to be learned in the practice of medecine, and requires considerable time. All reflecting physicians have become conscious, and often by sad experience, of the whole truth of this statement. In ordinary practice, every invalid bows down to science, and even the moſt incredulous, when their lives are endangered by fever, lose no time in having recourse to a medical man, in whose skill they confide. They liſten to his advice, and scrupulously follow his prescriptions.

God forbid that I should lay too much ſtress upon this fact, but I declare there is nothing so consoling to the physician, as such confidence upon the part of the patient. The physician finds thereby the legitimate support of his character and calling. With it, he is more ſtrong and more powerful.

So it is in the general practice of medicine

at a diſtance from our springs. At Vichy, it is quite different. There exiſt no worse species of sceptics than some of the drinkers at our springs, contemptuons assailants, despising reason and facts. I do not spare them, more than they spare us. One would suppose that a settled hostility exiſted on their part, and as it were, a wager to lower medical aid, and to deny its power.

This ſtate of things was attributed to intereſted motives. Hints were thrown out with regard to pecuniary impositions, and excessive fees, true perhaps in some cases, but so shameful that we blush to mention them, and only do so contemptuously. When a man has the honour of devoting his life to alleviate the sufferings of others, he owes it to himself, to look down on such human weaknesses.

The scepticism of visitors to our springs has other more intereſting and more serious causes. Chronic diseases, the only ones we have to treat at our mineral waters, invidious in their development and slow in disappearing,

resiſt too often the efforts of science, and exhauſt the patience of invalids. In moſt cases, when a patient arrives, in order to place himself under thermal treatment, he has already exhauſted fruitlessly all the resources of art. Suffering during a lengthened period and irritated by these suffering, his confidence in science is weakened, if not extinguished. This ſtate of discouragement muſt be regretted; but it muſt also be admitted to a certain degree, that it is legitimate. Human nature is not fully gifted with reason and ſtoicism. It is not true, that we become accuſtomed to pain. There is more truth in the fact that when people suffer, they become unjuſt, and they feel a sort of satisfaction in making some one accountable for their sufferings. Right or wrong, the physician receives the blame and is made responsible for all the imperfection of our organisation.

Patients still believe in the efficacy of the waters, but when they are told that the waters can be taken in baths and drinks, they think

it unnecessary to know more. Let us add, that they consider them as harmless and innoccuous; and we believe, that we have thus given more truthful reasons why they have so little confidence in all medical treatment, and consider as unimportant the syſtematic use of the waters. Patients in a word take the treatment into their own hands, bathe in the waters, and drink them heedlessly and immoderately.

Such miſtakes are followed by consequences easily foreseen. We now address ourselves to those invalids who take it foolishly upon themselves to advise their fellow visitors. Are they aware of what they do? or are they to be pardoned on account of their ignorance? Their conduct truly characterises in one way the habits of our thermal springs. Those self conſtituted advisers are to be seen walking about the park at Vichy, and are also to be heard at the tables d'hote affecting great knowledge and independence. They speak of medicine and of mineral springs like the firſt

chapter of the "Medecin de soi-même". Around the different springs, they show the example of drinking immoderately, "as the waters do good, too much of them cannot be taken." They drink large glasses repeatedly, partly from conviction, and partly to carry out their own boasting. They thus draw on more timid invalids, unfortunately too easily misled. It is only after the entire course at the waters, that accounts are settled : and as we have shown in our preface, the following observations express the results.

Some are stopped at the very outset by the rash use of a treatment which brings a return of acute affections but imperfectly subdued. The same result occurs to others from excessive doses, and want of method in the treatment. Every year, such cases are to be met with, invalids coming to the thermal springs in the hope of obtaining a long desired cure, and for the most part in a favourable position to effect it ; yet they return home in the same state as they came, sad, suffering, and discou-

raged. Others on the contrary, are able to drink enormous doses of the water without any apparent difficulty. They feel at the same time an alleviation of their sufferings, which cheers them. However, some time after the treatment, the improvement disappears, and the former symptoms return. The patients moreover feel themselves affected by debility and proſtration, the cause of which is unknown to them, and which in truth muſt be attributed to an alkaline intoxication, more or less advanced.

A serious queſtion indeed! Physicians themselves have not considered it sufficiently, and some even have denied its exiſtence, under the silly plea that they never witnessed such cases. Our professional brethren practising at a diſtance from the springs have observed it certainly more than ourselves. We shall return to this subject, because it is an important and serious cause of failure in the therapeutic treatment at Vichy. Every thing requires time to operate. Diseases muſt take time to

disappear, and the alkaline intoxication tim likewise to shew itself.

These however are only remote accidents and failure in treatment. But when to such failure, already so painful to the patient, and so contrary to the intereſts of science, are added unexpected and violent accidents increasing the ſuffering, and adding to the gravity of the disease or bringing on its final termination — when, as sometimes happens, a ſtrong patient is carried off in two or three days, owing to imprudence or excess! We make this remark, because death in such cases is almoſt always quick. These cases fortunately are not of frequent occurence: and moſt certainly, if patients had less prejudices, and were not slaves of routine in using the waters, we should have to relate fewer cases.

This is the reason why the 15th article of the new regulations, giving a sort of official authority to all the abuses and errors exiſting at our thermal waters, appears to us pernicious and to be regretted.

Let us resume. Unsuccessful treatment, serious accidents in the future, and often sudden and terrible ones at the present time, such is the ſtate resulting from false notions and imperfect medical knowledge, which it is our task to reform. Happy if we can defend ourselves from the reproach of having done likewise!

Here our pen hesitates, and we need courage. *Noſtra culpa.* In our profession, it is often a duty to accuse ourselves and to dare accuse our professional bethren. If then patients be right to award to thermal treatment, only a mediocre importance, have we not furnished them with motives for so doing? And if the new regulation has in some way made our advice useless, is it not a juſt judgment which is passed on them? Let us remember a short time since, and let us be humble.

Who in fact inaugurated at Vichy the incredible and fatal system of drinking the waters to excess? Who prescribed 15 and 20 glasses, even from five to ten quarts daily,

considering the human body as a chemical vessel, and thermal treatment as a combat of alkali againſt acids? And since M.r Petit's time, who was the great advocate of those theories? How many of our professional brethren imitated him and continued his deplorable mode of treatment, abandoning the patients to their fate, and to their thirſt, giving them as the only advice — to stop after being saturated!

In writing these lines, I admit that I am ready to deny my own statement. Nothing however is more true. It is in this way, that medical treatment is generally understood and practised at Vichy. And yet people are aſtonished that the good sense of the public, witnessing such excentricities, even when seduced by them, in the end, turn their authors into ridicule. Fontanarosa said the jokes which were laughed at and repeated for all sorts of purposes, were a receipt purchased everywhere, but he himself was held in low eſtimation. Such is the moral of the

question. We shall perhaps return to those queſtions of medical doctrine which are of so much intereſt to public health. Let us however for the present remind our readers of the words of Alibert, too much forgotten now. " The good physician at the thermal waters ,, should be the prieſt of the temple. He is ,, placed there to enlighten invalids; to direct ,, them by a sure method : and to rectify the ,, ideas and prejudices they bring there. "

Full of respects for these wise precepts, let us continue. A man is never treated worse than by himself. No man, doctor, or prince of the science can or ought to be his own physician. The moſt ancient joke cannot reſiſt this truth. Were Hippocrates ill, and Galen alive, he would have called in Galen to prescribe for him.

On the other hand the thermal treatment, that of Vichy at leaſt, has nothing, it may be believed, insignificant in its action, nor very mild. On the contrary, it is moſt active, and powerful : it muſt be so, in order to un-

derſtand the powerful and happy modifications to which it subjects the Conſtitution, slowly and seriously undermined by pain. But experience shows at present that it is capable of doing as much harm as good. " Go ,, to Vichy in good health, says an old pro- ,, verb, and you will come back ill : go there ,, in bad health, and you will come back well." That is to say, the waters muſt be taken with prudence and extreme reserve.

For what object do touriſts and amateurs come to our springs, people for whom the future will shew, that the 15th article was drawn up, and who should only be allowed, as it were, to look at our springs, and that even at a diſtance! As for them they should be persuaded that it is not indifferent to take the waters in baths, douches or drinks, or in doses. Particular indications are conſtantly observed, requiring one or the other of these modes of treatment, and it is not easy to decide between them. The moſt experienced physician acquires this knowledge only after

repeated experiments. And certainly as to sound medical treatment, it requires as much medical skill, knowledge, and tact to prescribe a bath or a glass of mineral water as to order any other powerful medicine.

Truths so natural and simple appear novel at Vichy, where people are little accuſtomed to hear them, but they give to thermal treatment its real importance and its right place in the practice of medicine and general therapeutics.

Whenever a disease appears, in which the Vichy waters are considered to be efficacious, the physician of the springs finds himself in presence of many difficulties, the principal of which are.

Firſt, to see, if it be fit, that the waters should be used immediately.

Second, to decide in what form, isolated, or combined, baths and drinks would be moſt advantageously used.

Third, to fix the doses to be prescribed, taking into due consideration, the disease, the

conſtitution, and the idiosyncracy of the patient.

Fourth, to watch attentively their effects, and according to circumſtances, to know how to increase or suspend fitly the use of the waters.

Among the indications conſtituing the entire thermal treatment, not one is invariable or subject to fixed rules. Pathological accidents, the age, the sex, and above all the peculiarities of conſtitution govern them and vary them during the entire treatement. Every patient has his special organisation, his way of feeling, his mode of being ill, and suffering. Each requires a particular treatment for himself. This is not the time to develop our ideas in full upon the medical treatment and pathology of our thermal waters. These ideas will find their place in the clinical observations that we intend to publish, but this we may say, that the ſtudy of particular organisations which is a principle in the treatment of acute diseases, is ſtill more a rule and becomes the

real basis of treatment in chronic diseases; without admitting, as it has been too positively affirmed, that these latter affections are the result of a conſtitutional predisposition, a falliable dogma which too often miſtakes the effect for the cause. It is certain at leaſt, that by their deep seated as well as prolonged action, they communicate to the conſtitution particular changes which determine idiosyncracies or shew pathologically organic tendencies special to each individual.

It is at the thermal springs particularly, that it may be truly said, there are no diseases, but invalids only. It is therefore the individual; the conſtitution: the person who muſt be treated; such as nature formed him, or such as disease made him. It is for him that the treatment muſt be prescribed. Is it not evident, that the physician's task is in this case a complete one, as necessary and as difficult as in any other therapeutical condition?

Let it not be said that the medicine being the same, the treatment should be the same

in all cases. It is on the contrary in such cases, that the utility and importance of medical direction are apparent; and the necessity exists for the physician to know how to use the healing agency offered by nature. And we repeat, that we can judge how minute and watchful must be his attention in remembering the second principle laid down in our preface, that it is upon the intelligent or non-intelligent administering of the waters, the success or failure of the cure depends.

To study the particular conflitution of each patient and appreciate as clearly as possible his constitutional peculiarities; to define with precision his disease; its past and present symptoms; the causes which brought it on: the features by which it is characterised; its general effects upon the organisation: to understand perfectly the medicine to be used; to form a just notion of its immediate or distant, passing or present, powerful or mild action on the economy, its different varieties, according to the pathological case, to the different

means of applying it, and with all those elements combined, to find the connection uniting the remedy and the disease.

Such is the complicated problem, and in medical practice the only one, the thermal therapeutics present.

The mode of adminiſtering the waters offers for considerations two things conſtituting the natural divisions of this chapter — these are the form, and the quantity.

The form of adminiſtering the waters varies according as the thermal treatment is external or internal : and combines in the firſt inſtance reclining and shower baths : in the second inſtance, drinks.

The quantity affects both modes of treatment, and muſt be considered as much for the duration of the bath, as for the number of glasses of water taken. It is the moſt important part. To this, may be added, the time the treatment should occupy; and we can express ourselves briefly and clearly upon this point. It depends essentially upon disease

and the patient, and it is therefore impossible to fix it with any degree of precision.

I shall not say how far I condemn the 21 days and the 21 baths, which the majority of patients consider as a duty and a precept. I prefer to explain myself on these matters.

Formerly, people came to the springs with more serious views and always for an important object. Women, forced by their organisation to abstain from all treatment for several days, could only submit themselves to it during 21 days in each month. They made use of the waters during that period, and hence the origin of this pretended obligation of 21 days. It is true that woman have very properly liberated themselves from that obligation, but men still adhere to it! I do not think they have any right to do so, and most certainly they have not the same cause.

II

EXTERNAL TREATMENT — BATHS AND DOUCHES.

Baths form, at Vichy, one of the modes of treatment by the waters moſt used, and conſtitute the moſt important part of the external treatment. They fill a moſt useful place in thermal treatment. Their physiological and therapeutic effects deserve to be carefully considered.

In a hygienic point of view, the Vichy baths are nearly the same in their effects as baths in general. The salutary effects upon health, attributed to baths in paſt times and among people of every nation are well known. "Bathe, say the old books, the bath is beneficial to the body, gives it suppleness and agility, cleanliness and serenity, and civilises the man."

I remark however on this latter point, that the bathers, male and female, at Vichy often employ their time when in the bath making

flies swim until they are drowned! An effect of the waters, but let us continue.

Considered in their physiological and therapeutic action, the Vichy waters act upon the body in two ways.

They stimulate at firſt the cutaneous ſurface, and thus excite the functions of the skin.

They penetrate afterwards into the tissues and bring about modifications in accordance with the chemical composition of the waters.

To ſtimulate and absorb; such is the double mode of action upon which are based the elements of their application; and from which their pernicious and particular effects flow.

The absorbtion of the mineral elements which the waters contain played a great part in the medical doctrines which prevailed and ſtill prevail at Vichy. It was made the absolute ſtarting point for the cure of diseases, the baſis of a specific treatment that it is impossible to support, and to which moreover it is dangerous to pretend. Undoubtedly the faculty of absorption muſt be awarded its legitimate

action, greater in certain diseases than in others, but in no case, muſt the healing influence of the Vichy waters be attributed to it. It would be difficult to calculate exactly the quantity of mineral salts the body absorbs in a bath at Vichy. It varies according to the general and particular organisation of the individual, and to the ſtate of the skin, more or less susceptible or dryer at the time of the bath. Absorption is more active when the patient is faſting, than in the middle of the day; a certain time after the treatment has begun than at its commencent; but it is always easy to observe it. After a half an hour, or an hour spent in the bath, the wine changes its nature, and its natural morbid acidity is replaced by a signal degree of alkalisation. The salutary secretion presents frequently the same changes which indicate positively the intimate penetration of medicinal principles.

The ſtimulating action of the Vichy waters is far more active in our opinion, in a greater number of cases and far more effective. It is

evident from the very firſt day's treatment. The skin, flabby, and generally dry and pale in chronic diseases, becomes ſtimulated and acquires the functionnal energy which it had long loſt. Soon after an increased vitality is evident through the body, and the result is, that the patient finds himself relieved and much ſtronger.

This feeling of renewed strength and ease is certainly the moſt remarkable and sureſt effect of the Vichy baths. We muſt note it, as acting on all patients. Nevertheless the Vichy waters are not always tonic correctly speaking, and care muſt be taken, not to consider them as such. It is to their ſtimulating action that they owe their tonic qualities. And this is not a trivial diſtinction, for if their action be not watched carefully, and their ſtimulating qualities be carried too far, the patient is weakened inſtead of being strengthened, and the effect of the bath is deſtroyed.

Many patients after the third or fourth bath suffer from a feeling of fatigue and debility

which is of not long duration; it is true : but which shows the necessity of accuſtoming the conſtitution gradually to the effects of this mineral ſtimulant. One or two days reſt suffice generally to put an end to those symptoms and the treatment is continued afterwards without further obſtacle.

Another effect of the Vichy baths which we are glad to remark and which contributes certainly to increase at firſt the invigorating action which the patients feel, is their sedative action in combating those painful phenomena which accompany certain diseases, for inſtance gravel, general affections of the urinary organs and especially those of the uterus. We are often aſtonished in witnessing with what rapidity in those latter cases, pains disappear in the kidney's, and seat; as well as abdomen, and groin.

A great number of women who come to Vichy bent down, suffering so as scarcely to be able to walk, recover their ſtrength in a few days, and get the use of their limbs, which

feeling is almoſt as agreable to them as a cure. In this case it is that the baths act so well, and in order that their effectiveness be rapid and complete, to use "*bains de piscine*" that is to allow the patients to remain in the water three, four or five hours a day, a practice we repeat (so as not to have to mention it again) which is often unfortunately a rash one during the treatment, and almoſt always a serious future danger.

If it were only nccessary in order to obtain the favourable effects of the Vichy waters, to expose the body to their influence, thermal treatment would moſt certainly be an easy thing. Unfortunately such is not the case and invalids are often wrong to forget it. What is requisite in the minds of the greater number is to take 21 baths of an hours duration, neither more nor less, after which the cure is complete. But mineral waters, whatever their virtue may be, particularly the Vichy waters from the fact of being so powerful, require in order that they may be benefi-

cial, to be administered in a proper manner and opportunely. If this condition be not observed, their efficacy is endangered and acts injuriously on the patient. Thus it is, we see every year at Vichy that baths, which are in all respects, the most precious of our resources, become the cause of serious accidents, and in some instances of instant death, to those bathers who use them in an unreasonable manner. Loss of strength: trembling in the limbs; agitation; want of sleep and the thermal fever, which is never necessary, have no other foundation.

In gouty patients, baths often bring on attacks of gout; among patients affected with congestions of the liver or the spleen, they bring back or cause ascitic effusions (*épanchements ascitiques*) or feverish attacks; and still more, according to the constitution of individuals, baths cause contractions of the muscles; swelling of the skin and of the sanguineous system; intense cephalalgia; cerebral congestions; and apoplectic predispositions.

It is requisite to be on our guard againſt those accidents, always of a serious nature, and the more to be regretted, that they are easily avoided. These accidents are always of more frequent occurence in very warm weather, and the season of 1861 among other, presented numerous cases. The season of 1865 was not inferior to it in that respect. The sudden death of two patients in the baths caused a great sensation in our thermal city. Baron Lucas's maxim was to close the thermal eſtablishment, when the heat of the atmosphere was too great. His conduct in so doing was wise, and it is certain, that in such times, mineral waters in baths or draughts should be adminiſtered with more precaution as they then easily become dangerous.

If on the one hand, the therapeutic uses of the Vichy waters vary with the indications furnished by the invalid and by the disease, on the other, their effects change according to their composition, their temperature and their duration.

At Vichy, baths of purely mineral water are rarely given and properly so. In spite of the decree of 1860, which gives the patient liberty to order the composition of his own bath, the administration gives them only on the special prescription of a medical man. For my part, I have scarcely ever had an opportunity, in my practice, of prescribing one, and I can see hardly any case where they could be useful. But I know well in what cases, they might be hurtful, and it would be tedious to enumerate them. The composition most generally used, is half mineral, half fresh water. We may even add that it is the one almost invariably prescribed by medical men at Vichy. The patients moreover know it and not one among them could be mistaken as to the prescription "*Demi-mineral,* 34° *centigrades, une heure.*" It is however true to say that the bath, in equal proportions, is proper in the greater number of cases, and it is not against the rule we plead, but in favour of the exceptions which do not appear numerous enough.

Too little attention in our opinion is paid to slight symptoms of irritation, spasms, nervous anxiety, feverish and broken sleep, which are attributed to the conſtitution of the patient, and which are really caused by over ſtimulating effects of the bath. In women, children, persons advanced in life; or feeble, these phenomena are of frequent occurrence; and it is important that the quantity of mineral water prescribed should be reduced to a third or even fourth part. Baths also cause frequently slight cutaneous eruptions, and inconvenient itching sensations, which become moſt unpleasant, and which it has been attempted to relieve by the addition of bran in the bath. It would certainly be much more simple for that object, to lower the composition of the bath.

These observations are equally applicable to the temperature and duration of the bath. Without affirming that it is impossible to fix the temperature for every one, and that it is necessary in such cases to be guided by the

peculiarity in conſtitution of every patient, a bath of 34° centigrades is often too high thereby contributing to the fatigue and weakness some times caused by the Vichy baths. It no doubt suits people advanced in age, very irritable or debilitated; but in the greater number of cases, we found ourselves fortunate by not going so far. The invigorating effect of the waters appeared to us to operate better and more quickly. The skin in the greater number of chronic cases has a dry heat which may be remedied by lowering the temperature of the bath, unless there be some general counter-indications, whenever the general ſtate of the patient permit it.

The regular time fixed for the Vichy baths is one hour, and every patient avails himself of that rule. Here again, there are however numerous exceptions, to be made, more numerous perhaps than for the composition of the bath. Unless the patient wishes, as M. Petit's disciples recommend, to absorb only the alkaline salts, it would be easy to observe that

the repeated ſtay of an hour in water poſſeſsing highly ſtimulating effects muſt exceed the powers of reaction of many patients, and bring on fatigue, general proſtration, and nervous disorders: without reckoning complete proſtration of the strength which appears only subsequently to the treatment; and which we consider as objectionable in the "bains de piscine". In old people, with sanguine or irritable temperaments, and weak and delicate conſtitution, baths of half an hour, twenty minutes, or quarter of an hour, are often more useful and even necessary. It is fitting also and more advantageous, not to give them daily, but to prescribe them only every two or three days.

All these queſtions however of the composition of the bath, its temperature and duration are connected with each other. They support or oppose, each other according to the different objects in view. A bath too strongly mineralised finds its action diminished, if not deſtroyed by the shortness of its

duration; as also too short a one may find more active effects in the lower temperature of the water.

This may give an idea of the numerous resources offered by the waters, and shows also how easy it is, the medicament being unchanged, to vary the applications, and obtain different therapeutic effects. The important point is, to ſtudy, on the one hand, the peculiar conſtitution of the invalid, and on the other hand, to manage skilfully the curing agency employed.

We have remarked above, that all thermal therapeutics are comprised in these two processes.

DOUCHES.

Douches are, as is well known, moſt conveniently and conſortably organised at the thermal Eſtablishment of Vichy. They are divided into two classes, *percussion* douches and *ascending* douches.

Percussion douches are very much in use;

moſt patients at leaſt desire to employ them. They are principally intended to obtain the resolution of the congeſted organs and act directly on the part affected and by the effects of the shock on the surface of the skin. But we believe that great delusions are entertained respecting their advantages.

M. Petit who made up for his narrow minded views, by attentive observation, remarked that their influence was often more hurtful than beneficial, and experience proves how wrong it was to employ them indifferently and on every occasion. Percussion douches, for inſtance, on the liver and spleen, brought on in many cases, a great shock to the conſtitution and painful feverish attacks, the leaſt dangerous effects of which were to make the patient suffer without benefit, and to delay the effects of the treatment.

It is only againſt sluggish and long ſtanding congeſtions that they can be employed with advantage.

In cases of congeſtion in the mesentery,

glands they nearly always bring on diarrhœa. It is moreover always hurtful to take them on the abdomen. They also bring on renal colics in gravel accompanied with calculi; they are of little use in cases of gouty deformity of the articulations, and when used in cases of congeſtion of the uterus, they are always to be feared and are always dangerous.

These accidents, which however result more from the abuse than from the prudent and methodical use of the douche, show with what prudence and reserve a treatment so energetic, and from which such beneficial effects are possible, should be employed.

In congeſtion of the proſtate gland, for inſtance, douches act slowly, but we have found them often successful, and they have been also beneficial in cases of neuralgic rheumatism of the neck of the bladder.

Owing to the conſtant failure and evident hurtful effects resulting from the *percussion* douches, an attempt was lately made to turn

them to account by using them not directly on the part affected, but on other parts of the body as a revulsive action. It is an idea! But the effects attributed to them for this object are simply those of the cold douches.

They are entirely foreign to the therapeutic treatment of our thermal springs.

Moreover, medical observation has not been able to affirm their success, and no proof exists that a douche of Vichy water, hot and prolonged for some time when applied to the legs or feet, ever brought about the partial resolution of a congestion in the liver.

In our opinion douches were employed at Vichy at too high a temperature, and were too much prolonged: 35° centigrade at least and they were employed for the space of fifteen minutes.

This kind of treatment, useful certainly in those cases of neuralgic rheumatism of which we have spoken, bring on a great agitation in the system, which the patient cannot support. People of nervous constitution are particularly

affected by it, and for all invalids it is a serious trial, after which great debility and nervous excitement, difficult to remove, inevitably follow.

These symptoms do not occur after cold douches, or all leaſt are of a much milder nature, and we use them more frequently. They are highly beneficial to combat weakness resulting from the baths, and as a ſtimulant in nervous debility.

They are at leaſt more tonic, and by the reaction which they bring to the surface of the body, they positively assiſt the salutary effects of the treatment.

We do not mean by this to recommend them exclusively; but we think that invalids would do well to make use of the cold douches frequently, and the warm ones more rarely.

The *ascending* douches are more frequently required, and are far more useful than the *percussion* douches. They muſt however be underſtood under these headings only when

they are introduced into a natural opening : the rectum or the vagina for inſtance.

They muſt therefore be classed under the denomination : *Rectal* and *Vaginal* douches. The latter is an improper expression and a dangerous remedy.

There are organs which require respectful delicacy even in the very words given to them. Vaginal douches give an idea of a sudden and violent shock which would be insupportable and moreover dangerous. These words and the practice itself muſt both be abolished from the medical vocabulary. The word *irrigation* should suffice; it is of a milder nature and shows even more effectually the therapeutic object to be attained.

Irrigations in the bath are often required and are moſt useful in affections of the uterus, with or without ulceration in catarrh particularly ; but they muſt be prescribed with great prudence and with a great attention to their effects. The peculiarity of conſtitution in the patient requires in this case special attention.

It is not unfrequent to find irrigations increasing the suffering of the patient and the flow of leuchorrhœa. In other cases, without causing any pain, they bring on fatigue in the limbs, a general sensation of debility, which requires the more to be attended to, that the cause remains as it were in a latent state and that the advantages of the treatment are endangered.

Rectal douches are of all the moſt salutary, and render important service in therapeutic treatment at Vichy. Their direct action on the mucous membrane of the inteſtine to which they give tone make them moſt effective in atonic affections, of the great inteſtine. They increase its conſtrictive action and ſtimulate its secretions in a moſt durable manner.

They act also effectively by the near approach of the organs, in diseases of the bladder, congeſtion of the proſtate gland, affections and in particular the fall of the uterus, and by their immediate vicinity in cases of flatulent and windy dyspepsia, in tympanites, corpu-

lence, conſtipation, and all weakness of the abdominal functions. In old men the falling off in the action of the inteſtines causes habitually a ſtate of congeſtion towards the head which they relieve in a short time.

In this case their action is really a revulsive one and of an energetic nature. They may also be used with advantage to bring on the menses or a flow of blood from piles.

Rectal douches do not offer the same inconvenience as the others; nevertheless they require to be adminiſtered, with method and discernment, if we do not wish to go too far and cause, inſtead of a salutary ſtimulating action, too great excitement, colic, diarrhœa, ſever and even a flow of blood. We recommend this to patients who are disposed to take them without fear and with pleasure.

III

INTERNAL TREATMENT — DRINKS

The firſt queſtion that the rise of the Vichy waters, as, a drink brings to the mind, is the

special action attributed to each of the springs in combating a well defined disease. Is it true that in any disease, gravel for instance, it should be treated necessarily by the Celestins waters? All the visitors, at Vichy, think so, and the majority of our confreres affirm it, and the little pamphlets by the Vichy company proclaim it. For our own part, we consider it as a custom by no means obligatory, and which in our usual practice, we often lay aside. We have already given our opinion on the question, when writing on the spring, Grande-Grille, and we refer the reader to those observations.

The result of those observations, is the two following axioms, which are the rules of our practice:

None of the Vichy springs possess any specific property, and they can replace each other in the treatment of all diseases.

In all cases, the most suitable spring is the one which the patient can best bear.

This latter rule being admitted, another

queſtion presents itself, the moſt important one, that of the way in which the waters are supported by the drinkers, when taken at their source. This point comprises every thing; in fact, if the waters can be taken without inconvenience: it is the essential condition of the success of the treatment, and the firſt ſtep to a cure. There are patients whose ſtomachs cannot bear the waters of one spring, whilſt they can easily bear those of another.

It is necessary to make several trials, in order to find the one they can bear beſt. But there are others, and they form the majority, who do not digeſt the water simply because they take it in too great quantities, and it is in these cases, that we see the painful consequences of the *saturation* syſtem. In other words the queſtion relative to the way the waters are borne, is in a great measure confined to that of the doses.

When we only take into consideration, the treatment by the Vichy waters, the alkali-

sation of the humours and secretions, and the absorption of bicarbonate of soda, a sovereign specific, and unique sanitary action, is it not evident that the task of accuſtoming the patients to the action of the waters muſt be easily neglected, and to make the patients drink them, muſt be the only object to be attained. The more that is taken, the better it is. And that is, we own, what aſtonishes us always to see the enormous quantities of water taken by the patients on their arrival at Vichy, and also the calm confidence, with which physicians ſtate that the way the waters are borne, well or ill, never fails to right itself. Perhaps so, but whether well supported or not is a question! This is why persons accept as a necessity, by calling them the *effects of the waters,* the numerous bad symptoms which in the *saturation* syſtem are observed in the beginning of the treatment. A singular confusion certainly of words and ideas, againſt which, we cannot sufficiently proteſt. No doubt, the beginning of the treatment is sometimes

marked by certain derangements which it is impossible to prevent; but those cases are rare, and it is not because they soon disappear, that we should on that account neglect them, and particularly confound them with the more frequent accidents which the drinkers owe to their own intemperance.

Large doses in moſt cases bring on an acute ſtate of the disease, produce vomiting; colics: enlargements of the abdomen; diarrhœa; severe cephalalgia: and general organic derangement. *Effects of the waters* it may be, but even so, the queſtion muſt be examined.

An exciting medical treatment and a bad one.

Another word of which an abuse is made, is *the crisis*. An idea has long been, and is ſtill, entertained, that the waters can be beneficial, only on condition, that they should derange the whole syſtem and revive the sufferings of the patients. Nothing is less neessary, nor less juſtifiable.

Sometimes, it is true, we see appearing in

patients certain critical phenomena, such as copious perspiration an increase of urine, or diarrhœa with or without colics, beneficial phenomenas and not over severe, and which appear only when the cure is progressing, and never at the beginning. Then what an error it is to call, *critical*, those disorders in the functions, so very different and of which we speak, and which far from bringing the patient relief and comfort, only bring on fatigue, return of pain, loss of strength, and a failure, almoſt certain, of the treatment. It seems useful to note down these different resuſts and faulty observations, because through them, patients are induced to attribute to the Vichy waters their painful disappointments. The treatment by the Vichy waters sometimes, we do not deny cause sad failure, but the waters have no share in them.

Effects of the waters, we deny : *abuse of the waters*, we believe.

That certainly would not happen, if small doses which are an indispensable condition

of success throughout the entire treatment, were prescribed more rigorously at the beginning, in half or quarter glasses, and often, by table spoonsfuls.

Such are the rules in prescribing the Vichy waters taken at the source, and if not complied with, we believe, no beneficial effects are to be expected. We have in treating successively of the different springs shewn the physiological effects, and except in so far as their special action is concerned, the therapeutic indications belonging to each of them; we shall not return to the subject. As for the details in prescribing them, and the different modifications which their use requires in the course of the treatment, we have not treated on them here. It is for the physician consulted to decide upon them. His task is to observe the patient, and direct him with intelligence, prudence, and skill.

CHAPTER THE FOURTH

The queſtion as to the efficacy of mineral waters in the treatment of patients presents itself surrounded with contradictory observations as it were, which render it extremely difficult. Undoubtely, it is of all remedies, the one which produces the moſt unexpected results. None other acts so powerfully and so wonderfully. Bordeu rightly affirmed that a chronic disease which resiſted its effects might be considered incurable. It would be delusive nevertheless to consider the waters as an infalliable specific. More than twenty years ago, M. Patissier, in a book that might serve as a model at present, gave to the physician of thermal waters, the sensible precept to study how to limit the treatment by the

waters. That worthy member of the academy applied to the thermal treatment, the philosophical rules belonging to the general practice of medicine. "The waters, he said, sometimes cure, often give relief, but, he adds, they do not work miracles. Words of truth and sense, which have not always been attended to, but which should be generally known.

Whatever treatment in fact may be employed in any disease, medical science remains unchanged; — a combat againſt the peculiar conſtitution of the individual, in which a remedy that successful in is one case fails entirely in another: and however effective the treatment by the waters may be, we muſt be on own guard againſt that exaggerated enthasiasm, which when communicated by the physician to the patient, inspires hopes always to be feared, when they are not realised. Invalids are already naturally enough inclined to expect a miracle in their case, without being encouraged imprudently in such expec-

tations. And as it is usual for invalids, when disappointed, to avenge themselves by falling into the contrary excess, and denying the efficacy of the waters, our beſt course is, without discouraging them or being ourselves discouraged, not to allow them to be over sanguine.

Mineral waters in general and those of Vichy, like the others, act, slowly. The conſtitution, when seriously affected by diseases of long standing, recovers slowly and gradually under their influence. Their salutary influence is long delayed, but is felt in the majority of cases. We muſt learn to wait without allowing ourselves to be discouraged.

§ 1er

DISEASES TREATED AT VICHY

We endeavoured, in speaking of the Chomel spring, to limit the number of diseases that may be treated by the Vichy waters. We muſt repeat it, before saying briefly what

clinical observation taught us concening their cure.

No diseases should be, or are, treated at Vichy, except chronic affections well defined, and having their seat only in the organs which are placed below the diaphragm.

In those disease, originating in the organs *above* the diaphragm, the Vichy waters are inappropriate and dangerous.

A work nevertheless was written declaring that they are salutary in organic affections of the heart. To write such opinions was an inconsiderate act, a paradox, and a fault.

In 1861, we were summoned in great haste to a patient who had come to Vichy, in order to be cured of congestion of the liver. He had already, in obedience to the prescriptions given to him, taken draughts during four days at the *Hopital* spring, and three or four baths, after which he was in high fever and confined to his bed. Upon examination, we found him suffering from a serious heart disease. The pulse gave distinctly the move-

ment, called the " bruit de rappel " : the face was flabby, the cheek bones red, and there was great oppression and proſtration. The patient had over the whole seat of the liver, a large tartar of ſtibia which certainly could not cure him! Our decided opinion was death in forty eight hours : he died in thirty six hours.

We cite this case in order to show how important it is to form a precise diagnosis in the treatment of disease by mineral waters. If when a choice is to be made of some one of the springs, or of the manner in which the waters are to be prescribed, the peculiarities of conſtitution of the patient are firſt to be attended to : on the contrary, when they are to be used, it is the disease which muſt be observed, and above all, attention muſt be paid to the causes originating the disease. In the case above mentioned, the congeſtion of the liver, which was not very considerable, did not conſtitute the real disease, but was one of the consequence of it : it was not the

cause but the effect : the effect of disease of the heart. The latter was the real and original affection, and it was one which proscribed expressly the use of the Vichy waters. It was owing to the ignorance of that fact, that the patient died.

DISEASES OF THE DIGESTIVE ORGANS

The Vichy waters possess a reputation fully in keeping with their efficacy in diseases of the stomach and inteſtines. These diseases are by far the moſt frequently met with at our thermal waters. It can even be affirmed, that there are few patients who are not under the influence of one of those affections, whether it has its origin in the inteſtinal tube, or that it is a symptom of the general state of the conſtitution, or caused by some derangement in another organ. Chlorosis, paludial cachexia; congeſtions of the liver, spleen or uterus &c., nearly always cause a marked derangement in the digeſtive organs; gaſtralgia; loss of appetite; long and fatiguing

digeſtions; all the characteriſtics in fact of dyspepsia.

To this latter affection, we muſt devote the chief firſt attention, and it is in reference to it, that the preceding lines were uritten.

Dyspepsia. — Dyspepsia has been defined to be a nervous disorder of the stomach, a broad and easy definition certainly, but as easily conteſted as given, and in any case, we muſt say, very difficult to be explained in a scientific point of view. A nervous disorder certainly, but is that all it is? It is true, that as far as the closeſt anatomical proofs go, dyspepsia occasions no apparent organic lesion, but is it equally true, that it gives rise to no physiological lesion? No one would be bold enough to affirm it. Between the organs and the functions, between the solids and liquids of the human frame, a considerable difference exiſts. For our part at leaſt, as physician at the thermal waters, that difference is a moſt important one, and thermal

treatment is always useful and nearly always successful in functional affections. But it is without any immediate use, and would become dangerous and fatal in a well defined organic affection.

Add to the general or local organic debility, the different injuries of the nervous syſtem and functional lesions, and you will have limited the entire action of thermal therapeutics.

Dyspepsia seems precisely to combine the whole series of those affections. It is always a symptom of organic debility. It is accompanied by derangement of the nervous syſtem. It is, as we have already stated, a nervous disorder, but it is often produced by an alteration in the secretions, and of the different liquid agents, combining the nervous syſtem, which produces the act of digeſtion. Consequently it is not only a nervous disorder but it is moreover, in medical language, a "disease". And there is the point wherein lies the difficulty of making a definition. A

choice muſt be made between either of those ideas, if they are not both to be adopted.

The truth is dyspepsia has not yet found its place in the enumeration of medical diseases. Its place is uncertain, and that is the reason why many physicians deny its very exiſtence. Unfortunately, to do so, does not prevent its exiſtence, and does not suffice to cure it. Without dwelling any longer on theories which are irrelevant here, we shall content ourselves with accepting dyspepsia, "nevrose and diacrise" at the same time, as the moſt strange and the moſt frequent of known maladie. An inconvenience more frequently than a disease, which patients themselves will acknowledge to be of little importance, but a dangerous, distressing, and often painful inconvenience, always of an irritating nature, and which has its own particular character, its perfectly diſtinct type.

Dyspepsia may originate suddenly under unhealthy hygienic influence, or a particular temperament; lymphatic temperament for

instance, with or without obesity; alone or joined to a certain nervous affection. It may still appear from hereditary causes, but it is in most cases symptomatic, and different diseases of the intestinal tube, gastralgia, chronic gastritis, enteritis, and dysentery nearly always bring it on. It appears in the convalescence of all serious diseases, all cases of debility, and organic decay. It often succeeds and survives them. How often is dyspepsia but the passing or constant symptom of gouty, rheumatic, and hepatic diathesis! A peculiar and abnormal state of the digestive functions, often wrongly understood, and imperfectly defined, but which explains the sovereign action of the Vichy waters in cases of internal gout, and their incontestable efficacy in the greater number of skin diseases.

Certainly a serious study of all the causes which occasion dyspepsia, symptomatic and spontaneous, would be most useful here, but such a task would soon extend beyond the proper limits of this book. Let us say how-

ever that all the physical and moral conditions of the body which bring about organic depression and nervous debility may produce it. Disease, first of all : excessive labour : the abuse of pleasure : sorrow : emotions : unhealthy dwellings : bad food ; and habits of indolence. I observe in cases of men, the excessive use of tobacco which debilitates : in cases of women, the use of pastry, and cakes which fill the stomach and tire it, without any benefit.

In such circumstances, it is easy to understand what a vast field our social habits offer for the development of disease ; and it was not without reason, that professor Chomel called the attention, too long neglected or forgotten, of physicians to dyspepsia, and declared justly that dyspepsia affected at least the fifth part of the population. And the most prudent even do not always escape it.

Brillat-Savarin, the accomplished gourmand, the type of gastronomy, and a perfect cook, who had so much foresight and was so

delicate in his mode of living, contradicted, after dinner, all his principles, by falling into a disturbed sleep. He was in fact dyspeptic. Heavy somnolence is an ordinary, but not the sole sign of dyspepsia.

Many persons are frequently to be met with in society, with the appearance of good health, but complain however of dyspepsia. Some are tormented after meals, with yawning, flatulency, heartburns : with a sensation of fullness, and sometimes heat in the epigastric region : others feel a more or less acute pain in the same region : heaviness in the head, or cephalalgia : the latter in fact reject a portion of the food they had taken, or feel indisposed, fatigued, heaviness in the limbs, and general depression. All those symptoms, united or separate in the same person, constitute dyspepsia, the essential characteristics of which are, that they appear after meals.

I insist particularly upon this last feature which gives to the disease its special character, and forms its peculiarity. As long as the

patient is fasting, he is well : do away with the necessity for eating and you do away dyspepsia. Unfortunately, however great may be the wish for the remedy, we are forced to prefer the painful sufferings of the disease, which then at once come on again. In a quarter of an hour, half an hour, or an hour after the meal, we see different symptoms more or less numerous, and more or less painful, appearing, such as we have just noted. It is a hard case for a person who only sat at table "*par raison*" !

Those morbid, tiresome, and painful symptoms last two or three hours, after which, when the work of digestion is over, the patient recovers his normal position. It is easy however to understand that such a position cannot be prolonged for any time, without the general health becoming affected. Often we observe, a great weakness of the whole system, and we see patients reduced to extreme debility, lose all energy and waste away — Physical and moral debility. The patient bears his

life as a cross and breaks down gradually. Nutrition is seriously affected, and in addition to the impossibility of patients making any effort, we see sometimes hypochondria, continued sadness, nervous irritability, and unfitness for all intellectual occupation, of which literary men and particularly men of delicate susceptibilities, offer frequent and sad examples.

Dyspepsia may be cured by the means at the disposal of ordinary medical practice. It is still better and more easily and by hygienic means, but it is never so rapidly and surely cured as by the Vichy waters. Whatever may be the causes that gave rise to the disease, and they are varied, we have observed that by means of a well directed thermal treatment an evident improvement; and in most cases, where the disorder is symptomatic of one of the affections itself subjected to the influence of the waters, the patients has almost the right to expect a cure. Provided however that he wishes for a cure. This consent is the more necessary, and is more difficult than it appears

and irregular life; or by vicious and indolent habits which muſt be reformed; if the patient does not wish, after the lapse of some time, to lose the benefit of the thermal treatment. The moſt usual symptom of dyspepsia is want of appetite. Nearly all patients sit at table "*par raison*" as they say, and many fear even to eat. The debility of the digeſtive organs is also a very common characteriſtic; we may say a general one in dyspeptic patients: all digeſt slowly and that can be underſtood, as dyspepsia is always a proof of organic weakness; but this ſtate is one, upon which the waters act with the greateſt efficacy. After the firſt few days of the treatment, the ſtimulating action of the waters is felt upon the mucous membrane of the ſtomach: the appetite returns, often by degrees, sometimes at once: the digeſtion is accelerated, and at the same time, the painful symptoms accompanying it disappear. The patient is quite aſtonished to feel that he eats and digeſts like every one. The only thing to be feared is,

as the disease generally is caused by an inactive that an action too ſtimulating may be caused by the use of the waters. This result is easily obtained by the immoderate use of large doses : in this latter case, the beneficial effects of the treatment soon disappear, and the cure is not only endangered; but there is a risk that the disease will increase in intensity. On the other hand, in watching carefully over the effects produced, the improvement continues and increases : the diarrhœa frequently accompanyng the disease ceases : the general healt improves : the patient becomes cheerful, and the cure is altained with all the appearance of an almoſt perfect recovery. We muſt not however conceal the fact that the cure does not always occur in so favourable a way many circumſtances relative to the long ſtanding of its disease, and its particular character the ſtate of the general health : the idiosyncracy of the patient often impede its beneficial results and make it longer and more difficult to be accomplished. Not only are

the waters not always salutary, but there are, we repeat, circumſtances in which they may become hurtful. It behoves the physician at the waters to examine these difficulties; his mission is to ſtudy carefully the patient, the disease and its complications: making it a rule never to give the waters in any case except in moderate doses, a quarter of a glass or half a glass at moſt.

Gaſtralgia. — The Vichy waters do not appear to us to be effective in gaſtralgia. We mean by gastralgia that painful neuralgia of the stomach having precisely for its essential characteriſtic that symptom conſiſting in a fixed pain which sometimes exists: and which in other cases is only to be observed in a sharp attack most painful and similar in intensity to fits of hepatic colic which sometimes come on in the same day, sometimes at intervals of months: and occasionally continue without intermission for several hours. It is well known how difficult it is to cure, and how it resists all therapeutic treatment: and is one

of the chief reasons why the Vichy waters have but a limited influence in these cases. On the other hand, the purely nervous element of the disease seems at once to be an obstacle to the using the waters, as they are rarely successful in affections of this kind. Of all the diseases we treated at the military hospital of Vichy, gastralgia, strictly speaking is the disease, in which we obtained the least satisfactory results. Of 15 patients, scarcely two were improved by the treatment: five found their sufferings alleviated: the others felt no favourable effects: and we were obliged to give up using the waters in five cases.

When however the disease has come on after a gastro-intestinal affection, when it is combined with dyspepsia; disorder in the biliary secretion: affection of the uterus: chlorosis: a more salutary effect may be expected, but it is always slow in appearing. Our observations enabled us to recognise the truth of the fact stated by M. Durand-Fardel, that the waters produce better results in combating

that gastralgia which appears by fits, than in that form of gastralgia in which the pain is incessant. It will appear that in this latter case, great and permanent suffering exists, for which the stimulating action of the waters would be hurtful, and in fact, patients frequently find their sufferings increase. We also considered that in order to obtain beneficial results from the treatment, the disease should have existed a certain time : patients seemed to us in these circumstances to bear the waters better, and to be less exposed to increased bad symptoms. It happens also that intestinal complaints are developed after neuralgia of the stomach. The waters in these cases are most useful, and powerfully assist in restoring the healthy state of the disordered functions.

Gastralgia is often complicated with vomiting more or less frequent, sometimes coming on by fits. In general, the thermal treatment acts favorably on this symptom, and succeeds when the vomiting is accompanied

by slight pain in the stomach. But if the pain be acute and incessant, and the vomiting continues, the waters even contribute to bring it on. In a word, the Vichy waters, useful in numerous cases of gastralgia, are useless, nay sometimes hurtful in others. Their beneficial effects can only be declared with great caution.

But the above is not the case in chronic inflammatory affections of the digestive tube; chronic gastritis; enteritis; dysentery; diarrhœa of long standing, with congestion of the viscera so often accompanying it, the waters there possess all that powerful action which made them so justly recommended. Their efficacy however is certain only when they are used after the complete cessation of the acute stage. Their use must not be delayed either until the disease has brought on a too serious organic derangement. These things being observed, it rarely happens that the waters do not bring about beneficial results and even unexpected cures.

It often happens that their efficacy is only

evident after the treatment, but it is nearly always shewn by an immediate improvement, by better digeſtion : a return of ſtrength, and a healthy ſtate of the syſtem. The diarrhœa symptoms appeared to us to be those which appeared moſt frequently to cease, or at leaſt to decrease, whilſt the invalids are drinking the waters. When diarrhœa especially is rather the result of a certain ſtate of the conſtitution, of general debility : when it does not depend upon any lesion in the inteſtinal tube, a treatment of seven or eight days generally cures it. How many of those poor invalids whom we saw crawling feebly around the *Hopital* spring, pale, exhauſted, and in a moſt feeble ſtate, feel themselves coming back to life, and leave Vichy, with the hope — long loſt, of obtaining a speedy cure.

We muſt remark that these waters act in a moſt marvellous way in dyssentery, and chronic diseases contracted in warm climates. In the military hospital, where the invalids from Africa are moſt numerous, we have observed

their powerful efficacy, and obtained, by their use, admirable results.

Spain and Portugal enjoy this privilege to the same extent : and it is not merely in inteſtinal complaints, but also in liver disease, bilious disorders : congeſtion of the spleen : paludial cachexia : and chloro-anemia peculiar to the inhabitants of these countries. So that it seem that it is most especially against the endemic influence of warm climates, that alkaline waters, and above all, those of Vichy should be turned to account. We can even declare, that however advanced the stage of the disease may be, it should not prevent the patient going to Vichy to try the efficacy of the waters. He will always have the well founded hope, if not of being cured, at leaſt of being relieved. We give as a general rule, that in all diseases of the digestive organs, the waters, in order to produce beneficial results, must be used, during the entire course, in very small doses and often diluted.

GOUT.

In this rapid sketch of the diseases for which our thermal waters are used, we place Gout immediately after the affections of the digestive organs, to shew how we understand it, in its treatment at Vichy. In our opinion, the important fact, if not the original cause of gout, is the want of equilibrium in the nutrition, by which the faculties of assimilation are often exaggerated at the expense of the faculties of elimination. The body of the gouty patient is so organized, that it absorbs every thing and throws out but very little: it is a constitutional greediness, and but for heterogeneous productions, gout may be well called, hypertrophy of the blood.

But on that aecount, it seems to us that this defect in the nutrition must begin with the absorption of the food, and that it is there that the remedy should be first brought to act, Whether therefore we have to heal a debility of the digestive functions, the Vichy waters

are to be used, and no others are so useful in stimulating and regulating them. The question, as to the efficacy of the Vichy waters in gout formerly produced warm discussions. It occasioned between M. Petit and M. Prunelle a long, and passionate debate. On the one side it was a question of life, on the other, a question of death. And what was most singular in this debate, was that M. Petit who promised to gouty patients a certain cure, treated them in such a way, as to increase their disease and bring it to a fatal issue : and that M. Prunelle in conscientiously predicting a catastrophe, relieved patients without believing that he was doing so. Thus systematic doctrines often deceive us!

It was wrong to consider the Vichy waters, an infallible specific against gout. Gout, at least hereditary and long standing gout, is only relieved and improved. It was also wrong to consider the Vichy waters as a dangerous remedy. Professor Trousseau, in his learned and eloquent lectures, proclaimed the latter as

his opinion. But M. Trousseau's opinion (bold disciple as we are) could not have on this question its usual impartial weight.

The truth is, that the Vichy waters, like all powerful remedies, produce opposite effects according to the way in which they are used. Their beneficial or hurtful effect in gout entirely depends upon the manner in which they are administered. We respectfully request M. Trousseau to remark this simple medical observation.

We lay aside of course as decided, the question of diagnosis and the not less serious indications resulting exclusively from the essential conditions of constitution, age, nature, and regularity of the disease: the intelligence and peculiar abilities of the physician.

Our observations, agreeing with those of many practitioners, make us consider gout as of all diseases the one which requires to be treated at Vichy with the greatest prudence.

Baron Lucas feared for his patient the slightest excess in the use of the Celestin spring. Suffering himself from gout, he always abstained from using the waters of that spring. M. Prunelle adopted the same system, and only gave the water, in very small doses, in cases of diarthrodial gout, which he called internal gout affecting particularly the digestive organs : such as dyspepsia, gastralgia, and gouty colics. " No means, said he, prevent more effectively than the Vichy waters, gouty irritations on the intestines so frequent in persons accustomed to high living." But in articular gout, he denies their efficacy, and considers them justly as being always more dangerous than useful.

On the contrary, M. Petit prescribed the Vichy waters in cases of articular gout, without drawing any distinction between the acute and chronic state, and to an extent that may be calculated from five to ten litres a day! The former inspector of the waters grounded his opinion and motives for such

practice on certain theoretical ideas which we need not examine here. We can only say, that as he imagined that he found the principal cause of gout in the presence of uric acid in the blood, and consequently in all the liquids in the human system, he gave the alkaline waters of Vichy as a certain specific to neutralise the cause and cure the disease.

This is exactly what Claude Fouet thought and wrote two hundred years ago on the gout and all diseases. "Acid coagulates the blood, the serous secretions, and lymph, and causes in the body, obstructions, suppressions, hardness and and concretions"! Unfortunately this uric acid was never found in the blood, and the general result of M. Petit's treatment certainly do not lead us to think so.

Vichy waters do not cure the gout, neither do any known mineral waters, nor any of the boasted specifics. They have however a very beneficial effect when administered with caution and discernment; given in this way, their relative influence is equally favourable in cases

of hereditary or acquired gout, whether articular or internal, acute or chronic.

A diſtinction muſt however be made, before using them, between acute gout, or we should rather say active gout and chronic or stationary gout. More useful in this laſt form of disease, the waters act dangerously in the firſt cases, and here we muſt make ourselves clearly underſtood.

By acute gout, we only allude to the fit itself: and we consider that no diſtinction should be made with regard to the use of the Vichy waters between regular articular gout and chronic gout properly speaking: the latter though it may break out spontaneously, in moſt cases follows the firſt. But in regular acute gout, the attacks are more decidedly inflammatory: they are more violent and intense: on the other hand, they do not laſt so long and after disappearing, leave no trace, in the articulations affected by them. It is only after successive attacks from the effects of time and when the chronic stage begins, that

the articulations remain swollen heavy, or œdematous; that they become deformed and are covered with nodes and concretions. Then also the attacks are very painful and even more frequent, and longer, but they are more easily calmed, and drag on without acute inflammation, which enables the patient to use the Vichy waters. But it is indispensable to observe, that by using them there is a risk of bringing on a relapse which is at leaſt useless.

Whatever idea may be formed of the gout, people generally agree in admitting that fits of the gout should be allowed to go on, as they are considered to be a critical effort to get rid of morbid productions. It is for that reason that practitioners exclude from their treatment all active medicines that might be an obſtacle to this natural tendency : and that all remedies recommended againſt the attacks are in the end hurtful to gouty patients who use them. The Vichy waters owing to their stimulating action do not act otherwise in similar cases ; at times it is true they appear

to relieve patients and to calm their sufferings: to shorten the length and intensity of the attack, but it is always to be feared that their use may cause a dangerous reaction. Each of our confreres at Vichy could cite several cases of this kind: and where the waters are given in large doses, then to prove the truth of M. Trousseau's assertion, a relapse of the fit is brought on, and serious, dangerous symptoms appear. We may expect in a certain lapse of time, almost indubitably, fatal symptoms: in most cases, a serous apoplexy carries off the patient.

We notice particularly this danger, because it is not fully understood by all practitioners and patients. There are still at Vichy a large number of gouty patients who treat themselves or are treated by the system of M. Petit; drinking immoderately without any fear of bringing on a attack, not dreading the use of the water when the attack has come on, and generally declaring that the treatment has agreed with them, and that their health has improved. The misfortune is, that the great

majority of the patients quoted by M. Petit as having obtained from the thermal treatment adminiſtered in this way, a relief during two, three or four years, died suddenly from a relapse of gout.

The proper time to use the Vichy waters is in the interval of attacks, and as far as possible from the laſt attack. If too near the laſt attack, a new one is to be feared, and it is necessary to be moſt prudent, for there is almoſt as much danger in provoking nature as in reſiſting its action in a criſis. The Vichy waters, drank immoderately, and baths, bring about such a result in the case of a considerable number of gouty patiente. In such cases, the treatment muſt be suspended or at leaſt diminished, according to the violence of the attack or as long as the fever, and articular inflammations have not been calmed. By observing these precautions, a palliative and very salutary action againſt gouty diathesis may be obtained. The general health is thus improved, a great decrease of inteſtinal and

gaſtric symptoms occurs, and the attacks become more rare, and less painful.

In combating the ſufferings conſequent on articular gout, the following results may be ſtated. Swelling of the extremities, of a ſlow or painful nature, and pains without ſwelling improve or diſappear.

Contractions of the joints, particularly if they be of recent date, moſt generally yield to the treatment : the diſeaſed parts recover their natural poſition, and elaſticity. Gouty patients, completely crippled on their arrival at Vichy, have been obſerved to throw away their crutches before the end of the ſeaſon.

Nodes, when ſmall and of ſhort ſtanding, may be abſorbed. We ſtate this more on the faith of our brother practitioners than on our perſonal experience : in ſome rare caſes, they open and are carried away by ſuppuration : but when they have exiſted a long time, they reſiſt generally : and in the ſame way, when the articulations are anchyloſed, when

they are slowly and seriously deformed, the treatment only acts upon them in such a way as to prevent their being aggravated.

In fine, the Vichy waters are more advantageous in cases of gout than any other medical treatment, but we must in using them, set aside all idea of a specific action implying the impossibility of a cure.

It is in modifying the general state of the constitution, that the Vichy waters act on the diathesique principle; and we may believe that they owe their efficacy, superior to that of other mineral waters, to their special action on the digestive organs, and to the regularity they bring about in the functions of assimilation.

CHLOROSIS.— GREEN SICKNESS.

Chlorosis cannot be called, like gout, hypertrophy of the blood. On the contrary, it is the direct opposite. It represents its impoverished state, and its want of elasticity and fibrine qualities. But as in gout, it is in the

digeſtive organs, that chlorosis muſt be assailed. The alimentary functions muſt be stimulated, roused, and invigorated, and for this object, the Vichy waters are highly advantageous. Whatever form chlorosis assumes, whether idiopathic or symptomatic; slight or grave; simple or complicated with gastralgic phenomena; palpitations; amenorrhœa, the waters succeed wonderfully. This is an incontestable fact and is proved by daily experience.

Every year, we see arriving at Vichy, great numbers of young girls, pallid and sad looking, languid in all their movements, breathing sometimes with difficulty and obliged to pause every moment from palpitation of the heart.

Those young girls suffering from decided chlorosis recovered in a month their animation and freshness: a complete transformation took place in them: their movements were full of life: and joy mixed with the

freshness of youth and recovered health gladdened their features.

Chlorosis, whatever form it may take, we hare just said, is always cured in all its degrees, or most favourably modified, by the Vichy waters. We shall see further on, without any necessity of dwelling on it now, with what efficacy, the Vichy waters act in cases of chloro-anemia, consequent on congested derangement of the viscera, and of paludial cachexia, and whenever the blood is impoverished by chronic affections : causing disorder in the organs of nutrition and affecting the general health.

They are not less beneficial or salutary in simple and idiopathic chlorosis : in this case no organ is diseased, but all suffer, all the functions act slowly : the constitution is seriously affected, and it too often happens that patients are neglected.

Digestion is at first deranged : the appetite is weak and capricious : the stomach is powerless, food is badly digested, causing the-

re by pain and spasms. The menses are always irregular, diminished, and in most cases stopped : the result is extraordinary nervousness, and it would take a volume, to describe all the physical and moral sufferings of the persons thus affected.

The first effect of the waters to remedy this general and constitutional derangement is to act upon the digestive organs which they stimulate, however enfeebled they may be. In a few days, in the majority of cases, the appetite returns, and digestion goes on vigorously and regularly. The rest follows naturally : patients digest well, receive more nourishment and by a more complete assimilation, the entire system soon feels the effects of the first stimulating action.

It is thus, from the immediate and consecutive effects of the treatment, that the derangements of the functions caused by the disease disappear gradually. The menses return, after having ceased, become regular and normal : oppression and palpitations of

the heart are no longer felt: strength returns, and the complexion becomes animated, so true it is that though the alkaline action of the Vichy waters does not conſtitute all the treatment, there is perhaps no disease in which the waters are more beneficial than in chlorosis.

We do not however believe notwithstanding the opinion of some of our diſtinguished confreres, that the Vichy waters are sufficient to cure chlorosis entirely. Iron, in our judgment, is indispensable in this case, because it alone produces the increase in the size of the globules of the blood. The Vichy waters, even the moſt chalybeate, do not contain it in sufficient quantity. They should at leaſt, in order to succeed, be continued for a long time, and then there would be a still more serious inconvenience.

It may however be admitted, that in cases of slight anemia, or brought on by copious hemorrhage, the thermal treatment might be sufficient; but when the disease is deep

seated, and the impoverishment of the blood is carried as far as cachexia, it is necessary in order to avoid the chance of relapse to continue the salutary action of the waters by the prolonged use of chalybeate preparations.

DISEASES OF THE URINARY ORGANS.

We place under this title, according to its importance, gravel in all its degrees and symptoms; vesical catarrh : congestion of the prostate gland, and neuralgic rheumatism of the neck of the bladder. *Renal colics* are connected with certain stages of the gravel, of which *stone* may become the last and most formidable symptomatic effect.

GRAVEL.

Gravel exists, exclusive of gout, and it is in that respect we shall consider it. When gravel is connected with gout, of which it is so often an important symptom, the influence

upon it of the Vichy water is inconteſtable. An improvement becomes soon evident, which is also observed in the greater number of the gouty symptoms exiſting in other parts of the body : it even sometimes disappears, for a long period, but we muſt expect to see it return, according to the movements of the diathesis which produced it. It is otherwise the case in pure gravel, whether it be an affection of the urinary organs, or whether it depends upon a general affection of the conſtitution : the Vichy waters having a more powerful action on it, can cure it.

In this disease, it is necessary to diſtinguish its position or rather its different degrees. The case of a patient whose urine is more or less loaded with deposits and sediments adhering to the bottom of the vase does not conſtitute gravel. This remark has been made, and nothwithstanding its insignificance in the eyes of medical men, it has not the less real importance for the patient who is often thereby deceived. This state of the urine is in moſt

cases produced by some other complaint than gravel, and not connected with the kidneys, a disease of the bladder, or urethra, even a diseased state of the liver, spleen, inteſtines, uterus, or a peculiar state of the digeſtive organs.

In order to decide that gravel does not exiſt, the urine muſt contain sand, that is to say, very small red or yellow and grey concretions perfectly separate, brittle, and which cannot be crushed by the fingers. It often happens that those small concretions are only transitory, appearing by chance and disappearing to return again without increasing even in size. This conſtitutes intermittent gravel which we observe principally, as the precursor of uric, rheumatic, or gouty diathesis.

But in cases of pure gravel however, these little concrete particles increase gradually in size, unite and become gravel : the gravel becomes calculous, and thus are realised three degrees of the disease of which the pre-

dominant symptom is that frightful and often irresistible lumbar pain returning by fits and extending over the abdomen, which may be described as the disease itself. It may be called *renal colic.*

Gravel in its two firſt forms appears often so mild, that it may be almoſt considered simply as an inconvenience : it is not rare to see people pass large quantities of sand and gravel, some of which are large enough to be considered as calculi, without feeling either inconvenience or pain in passing them. At times, the are accompanied by a feeling of weight and flying pains in the loins. In such cases, the Vichy waters act with great efficacy; and a full season at the waters suffices to cure the invalid. But in moſt cases, gravel is accompanied by more or less acute pains of the kidneys and the bladder which are incessant, or follow, whenever urine is passed and when calculi exiſt: they produce nearly always renal colic. In this case, however, the Vichy waters are not less active, nor less efficacious.

Their stimulating action appears firſt on the kidneys, and increases their secretion, thereby aſſiſting in carrying off morbid matter. From the firſt days, of their use; not however before the fifth or sixth day, patients see in moſt cases their urine carrying off sand and gravel more abundantly. Other persons pass calculi in different states of formation and often large enough to cause great pain in the passage. We can here give a rather remarkable case of one of our own patients whose urine never presented anything but sand, and mixed up with thick mucous matter. After the fifth day of the treatment, he passed at two different times, a shower of gravel and small calculi. He passed forty seven after the laſt emission of urine! Similar cases have been often observed by some of our medical brethren. It is a complete clearance off of morbid matter which seems to be produced after increased organic vitality, the result of which is to bring back the urine to its original limpid state.

This firſt action of the waters is followed immediately after, by another of an essentially calming nature. The pains in the kidneys are calmed down, the lumbar region generally weighed down is freed, and nearly always renal colics are to a certainty arreſted in their progress. In these serious forms of the disease, however, it is to be underſtood, that the waters muſt be used for a longer period to shew all their efficacy, and that it is not after one year or even after two seasons, that a patient can flatter himself he is cured. Many causes moreover prevent this prompt recovery. The length of time the disease has exiſted, the idiosyncracy, acquired, or hereditary, which originated it, and above all, the patient himself, who often owes the development of the complaint to bad but agreeable habits, which he will not give up. Then under the influence of this treatment, and after a certain lapse of time, the symptoms return. There are many invalids of this sort who return yearly to Vichy without obtaining any other

result save momentary relief, and who do not fail to queſtion the Vichy waters without thinking of blaming themselves somewhat. It is easy however to underſtand that the thermal treatment with perseverance and attention, hygienic rules are badly able to triumph over an inveterate disease which by a bad way of living has become a second nature.

Good living muſt be given up, good wine muſt be taken moderately, and alcohol in every form muſt also be abandoned, as well as all exciting food. There muſt be a return to a sober and moderately active life, without which a cure is impossible.

In other cases, gravel has for its original cause disease of the badder or of its neck, or a stricture of the urethra. We shall return to the subject. It is above all, when it is complicated with dysuria and hematuria that it generally resiſts longer the mineral treatment, and it becomes evident, that it can only be cured when the complaint producing it has disappeared. But these various exceptions

produced by the etiology of the disease cannot affect the curative effects of the Vichy waters, and these are the most certain and effective remedy that can be used against it.

We make no distinction between gravel produced by uric acid, by far the most frequent, and gravel of another kind, urate or oxylate of lime, magnesian phosphate ammoniac.

We have treated with complete success white gravel which makes us think that the chemical action of the waters, whose importance in red gravel we do not dispute, is not of a specific nature, and depends upon the modifications, and stimulating action given by the waters to the functions of the kidneys. The distinction between the two as far as regards thermal treatment, admitted by us, exists in the way in which the waters, are administered. In cases of white gravel, we give the waters, in smaller propertions. We however question whether the latter is in reality gravel. We are inclined to consider it

as vesical catarrh causing an inflammation of the kidneys.

It takes place frequently in the entire urinary organs. We have juſt shown its existence from the kidneys to the urethra carrying the inflammation upwards or downwards and extending the disease from one point to the other. In this way gravel engenders vesical catarrh, but a ſtricture of the urethra, congeſtion of the proſtate gland, catarrh of the bladder cause, in extending upwards, gravel. It is, in our opinion, the way in which white gravel is developed, a queſtion of etiology, we repeat, which does not affect the beneficial influence of the waters, but which muſt be ascertained however, because it has an influence on the direction and result of the treatment.

The alkaline ſtate of the urine itself is not a proof of the exiſtence of white gravel, and on this subject, I muſt make a very important remark, which I owe to D^r^ Caudmond, one of the moſt eminent practitioners in the pathology of urinary diseases.

It frequently happens that this alkaline ſtate of the urine is only apparent, and this fact is not sufficiently known. We observed it in a very remarkable way, in one of our patients who came to Vichy suffering from white gravel; the urine was alkaline, loaded with mucous matter, and brittle: when pressed, it sunk to the bottom of the vase. Where they the cause or effect of vesical catarrh? Micturition was generally easy, but the kidneys were the seat of almoſt conſtant pain. These pains were the firſt to disappear under the influence of the mineral treatment; the urine became limpid, and scarcely clouded, except that it was apparently alkaline, a ſtate which of course continued during and after the treatment.

Two months after the patients return from the waters, he went by ovur advice to consult D^r^ Caudmont. At that time, his urine was slightly clouded and alkaline. Moreover, there could be seen through a glass, moving about, small atoms similar to the duſt

floating in the suns rays. I remark this fact which had escaped my notice, and which sufficed to make Dr Caudmond affirm their real acidity. " It is when they have cooled, " that they become alkaline, he observed to " me, but let the patient make water on pre- " pared paper and you will judge by your " own eyes." In fact, the paper from blue became instantly red.

It was clear then, we had to deal with a positive vesical catarrh which gave way gradually to white gravel. In such cases, it is important to observe that pains in the kidneys and the symptoms of gravel are the first to disappear, and in most cases completely. Our patient returned to Vichy the following year with a most simple case of vesical catarrh, and after having felt no further sufferings in the kidneys.

It sometimes occurs, that patients after having got rid of pains in the loins, and when the urine has become limpid, feel suddenly those pains return during the course of the treatment. This symptomatic return is

generally a transient ſtate of suffering and ends by passing calculi.

Upon this subject, we refer our readers to what we said relative to the source Celeſtins, and the caution necessary in adminiſtering the waters. The exiſtence of calculi in the kidneys is not always necessary to bring on renal colic, and the return of this complaint is frequently caused by over doses and improper use of the waters, Gravel however is of all diseases, the one in which larger doses may be employed for a certain time; a season of 30 days is never prejudicial, and is often necessary; and we have frequently prescribed with advantage in the middle of the treatment, four or five glasses of water daily, a quantity far greater than what we generally recommend. It is moreover important to carry out the good effects of the treatment, that patients should continue from time to time, when they have left the springs, the use of the Vichy waters exported. They have a soothing influence.

VESICAL CATARRH.

We have spoken up to the present, merely of the action of the Vichy waters on calculi of the kidneys, in order to ſtate that they act powerfully in their expulsion. When the calculi have reached the bladder and that either they are larger in size than the orifice of the urethra, or from some other cause, they are not expelled. They then conſtitute a new disease, similar to the calculi of the bladder, bringing on stone, the extraction of which belongs entirely to surgical practise.

The chemical action of the Vichy waters was however highly praised for dissolving the calculi and stone. Every one remembers the impression produced by that statement of the fact, and the hopes of certain recovery given to the patients suffering from calculi. The alkaline nature of the waters aſſiſted by the frequent observations of practitioners obtained for them that reputation. Unfortunately, experience has not confirmed the facts advan-

ced by theory; and the dissolving action of the Vichy water like that of other remedies, for a time highly recommend, for the same object, has been given up and acknowledged to be powerless.

When calculus, too large in size to be expelled, exists in the kidney or urethra, the urine alkalised by the Vichy waters cannot either melt or dislodge them, and does not prevent them from giving rise to serious symptoms in the combating of which medical science is nearly always powerless. When a stone is formed, in the bladder, the only means by which it can be extracted, is by means of lithotrity.

This however does not imply that the waters in these cases, should not be prescribed; far from it; they are useful to patients affected with calculi, or stone whose sufferings they calm, when they are given with that careful moderation which is required in a disease always of a serious nature, and tending to aggravation. Most certainly M. Ci-

viale muſt regret now the violently written pamphlets, in which he accused, with more warmth than discretion, the Vichy waters of engendering phosphatic and calcareous stone, and of developping the uric stone by changing its nature. Armed for debating, but not for argument : with excessive pretensions to chemical science, though as insignificant and erroneous as that which awarded to the Vichy waters the virtue of dissolving the uric stone. Neither one nor the other can be attained.

We repeat that the Vichy waters are moſt useful to patients afflicted with calculi or stone.

They are particularly effective and may render important service after the operation of lithotrity, either to assiſt in expelling fragments and prevent the formation of new calculi, or in combating the effects of vesical catarrh generally following the disease.

Vesical catarrh is often idiophatic or results from acute cyſtitis: it has also for cause, besides gravel and stone, a chronic inflammation

of the neck of the bladder or congeſtion of the proſtate gland; the ſtricture of the urethra or a diseased state of the conſtitution; but in all those different states, it is always very much improved or cured by the Vichy waters. Fetid, cloudy, purulent, and bloodstained urine changes gradually its nature during the treatment, and if the latter be prolonged for any time, it is not unusual to see it recover its normal state. Symptoms of disuria are those which remain for a longer period: they are also the most painful when the disease become acuter It is necessary in prescribing the waters to beware of a return to the acute state, particularly in the beginning of the treatment. Great caution and a regimen of small doses become then necessary in order to prevent disuria being followed by an impossibility of passing water.

Sometimes, the wine has recovered its limpidity, and patients remain tormented by a frequent desire to pass water, with difficulty and trouble in its emission. These cases are

moſtly observed when there is a coincidence of rheumatic neuralgia, or when a complication of the prostate region or a ſtricture of the urethra is joined to great irritation of the neck of the bladder. The patient is often subject to frequent relapses, and after a remission of some days, the urine is observed again to be loaded with filth, pus, and streaks of blood.

It is useless to say that vesical catarrh, kept up by a ſtricture of the urinary organs, can be cured, or even seriously improved, except after a previous enlargement of this canal. But even after that enlargement, and when there is no obſtacle to the flow of the urine, the Vichy waters act upon it very effectually and almoſt always successfully. The patient muſt not however forget that the slighteſt deviation from the regimen will prevent his recovery; and that in this more than in any other complaint, the thermal treatment requires to be seconded by a ſtrict hygienic mode of living.

The choice of the spring, and the doses in which the waters are to be given, we again observe, are moſt important to consider, particularly at the beginning of the treatment. If we allowed ourselves to be carried away by certain theories relative to the Celeſtins spring, and that the waters were to be prescribed in view of their chemical and alkaline properties, we would surely see all the symptoms increase and the disease become seriously aggravated. An indocile invalid, who from the second day after his arrival at Vichy drank, contrary to our directions, six glasses of the Celeſtins waters, was seized the nexſt day, with moſt acute pains, and a copious bleeding, which only yielded to the effects of cold hip baths prolonged for some time. Small doses are inasmuch the more necessary, that even with all possible precautions, the patients frequently feel symptoms of stranguary and pain in passing water.

The Grande-Grille is the spring we use in preference, in the beginning of the treatment,

owing to its properties being of a less exciting nature than those of the Celeſtins. It is only later, and when the acute signs are not likely to return, that we add the waters of this latter spring in varying the doses according to the nature of the disease, and conſtitutional peculiarities of the patient; but without exceeding at the end of the treatment, the maximum of three, and in rare cases, four glasses a day. This practice, we believe, is the beſt in order to avoid accidents and to treat the disease successfully. Vesical catarrh, like gravel, requires the patient to continue, at home, the Vichy waters, exported, and as we make it a duty to be always disintereſted, we inſiſt upon this laſt point.

It is indeed remarkable, that urine pathologically acid or alkaline according to the nature of the disease has in both cases an irritating action on the mucous membrane of the bladder, and tends to keep up and increase the pains, too often violent, felt by the patient. But if, by the use of the Vichy waters, their

acidity be deſtroyed, and their morbid alkaline nature can be replaced by an artificial alkaline property, they lose all irritating effects and pains are calmed down rapidly. It is a fact occurring daily in the practice of Dr Caudmond, and which, owing to his suggeſtions, we have ourselves frequently observed and verified.

DISEASES OF THE LIVER AND SPLEEN JAUNDICE, HEPATIC COLICS, PALUDAL CACHEXIA, ETC.

We combine under this general denomination, chronic hepatitis : jaundice : hepatic colics : congeſtions of the liver and spleen : and paludal cachexia.

We see often at Vichy, moſt serious affections of the firſt of these organs, invalids attacked with schirrous or cancerous tubercles. Such persons ought not to go there. The Vichy waters, unable to cure or improve those diseases are injurious to them, and cannot but contribute to their fatal result.

Our reserve on this point is by much the

more formal, that if it were possible to eſtabliſh in a more precise fashion, the different diagnoses of congeſtions of the liver and its hypertrophy we would see that even in this laſt affection, the waters are less effective, than people suppose. Chronic induration of the hepatic organ, which is in any case one of the moſt diſtinct signs of its hypertrophy, moſt usually resiſts their use.

Organic hypertrophies moreover seem to conſtitute less than the exaggeration of individual temperament or physiological idiosyncracy, and certainly in order to improve them, there is no need of general powerful remedies other than the use of some mineral spa during a few weeks. We muſt however admit the beneficial influence of the Vichy waters upon some invalids affected with hypertrophy of the liver, contracted in warm countries, because together with the action of the waters, there is change of climate, which should be prolonged and lengthened.

But where the Vichy waters are truly

powerful, where they are the moſt valuable therapeutic remedy, is in congeſtions of the liver and spleen arising accidentally or connected with paludal cachexia.

When treating of the spring *Grande-Grille,* we then spoke of the surprising cures effected by it and which M. Petit juſtly pronounced almoſt miraculous. We also noted the success obtained whilſt we were engaged in the military hospital.

This eſtablishment possesses incomparable opportunities for clinical observation. Africa and our colonies send there a great number of soldiers and sailors affected for many years with paludal and hepatic complaints, endemic in warm countries. We know and repeat deliberately, that the Vichy waters act moſt effectively on diseases contracted in these climates. Africa, the colonies, India and Spain are to be named especially under this head; and it is wonderful to see with what facility, swollen livers, greatly increasedin size, reaching beyond the navel and filling up a great

portion of the abdominal cavity, melt to some extent after two or three weeks treatment, under the eyes of the physician observing them. It is not that they resume their normal ſtate, but we have often remarked two or three centimetres, as a diminution in their circumference, before the end of the thermal season.

The consecutive effect of the waters is manifeſted much more clearly after a period of some months. But this does not take place until the above period, and it is fit that invalids should be made aware of this fact. And we address here this important remark to the numerous visitors coming yearly to Vichy, from Africa, Portugal, and Spain, that it is not sufficient to be cured at Vichy, but that they should withdraw as long as possible from the endemic influence of the above places, and sojourn some months in France.

At the same time, that the general symptoms improve, the digestive organs resume their activity, the jaundiced colour of the skin

wears away, every thing announces renewed strength and return of health. This speedy and powerful action of the waters is remarkable above all in congestions of the liver, the result of an inteſtinal affection. In cases, where the disease is the result of hepatitis, the treatment by the waters is slower. The organ remains stationary usually during the cure: three or four months after, it presents a slight diminution, but generally it is only at the end of several courses of treatment, that it resumes its ordinary dimensions. The invalid however fails not to feel early, the favourable influence of the waters. There, as in other cases, the general symptoms disappear, and the general health is strengthened.

Congeſtions of the spleen almoſt always brought on by intermittent fevers oppose habitually a greater resiſtance than liver diseases. But of twelve invalids affected by a swelling of the spleen more or less of long date, which we have treated at the Vichy hospital, none presented at the close of the treatment a signal

diminution of the organ. It requires generally a long time, and many seasons at the waters, for it to resume its ordinary size. But among all the invalids of whom we speak, we have seen the general organic condition improved, and the traces of paludal cachexia wearing away. This mode of action is traced out, except in some cases of slight congestions, and we must not expect from the waters different or speedier results.

The cure begins by general cachectic signs. The skin becomes ruddier, and loses its pale and dull colour : instead of prostration and a state akin to marasma, after one or two seasons, there are evident marks of recovered health : the swelling of the spleen disappears also, more slowly but surely. Thus spleens greatly increased in size, hardened, and rugged, yield by degrees, become smooth, are reduced in size until the congestion entirely disappears.

When the congestion is of long standing, the fever fits cease usually long before its total

disappearance : at other times, but more rarely, they remain, until the organ has resumed, its limit : in all cases it is important to watch the fits during the treatment, because the waters have a tendency to bring on relapses.

The baths especially occasion those febrile fits and perhaps we must attribute in part, this result to the bathers being obliged to bathe daily at the same hour. We agree with M. Finot that if it were possible to break through this custom, we would have less relapses to note. That is an advice which we always give to our patients. There febrile accidents otherwise are of very short duration : the momentary suspension of the treatment suffices moſt frequently to cause their disappearance, and quinine in case of need checks them always. We must however cite a case of Madagascar fever, where the fits roused by the waters reappeared as soon as the invalid bathed and which we never could stop, but by completely puting an end to the baths.

Paludal cachexia and congeſtions of the

spleen are accompanied frequently in an advanced period by infiltration of the limbs, dropsical effusions which are not a counter indication of the thermal treatment; the baths alone in this case are to be avoided, or at least, should not be used unless with caution and when anasarca is localised. They may in fact aggravate the symptomatic state and become dangerous. We have seen them even in the case of an invalid affected by congestion of the spleen which had already given place to abdominal effusion, and œdema of the limbs, bring back infiltration to the parts originally affected.

But in the majority of cases, provided that the invalid has not reached the point of prostration, these symptoms are improved under the influence of the waters administered as drinks. They should however be always considered seriously, and be prudently observed, inasmuch as they are of themselves a serious complication, and also an indication of a very advanced state of the disease.

Some of our confreres having particularly in view, the advantages of employing the thermal treatment in cases of large and deep seated congestions of the liver and spleen, have advised patients to return a second time in the same season to the waters. This we would not dare to counsel, and appears to us a dangerous experiment. It nearly always happens in these circumstances, that the patient who is relieved at his firſt visit to the waters, relapses after the second visit, to the same position as when he first tried the waters. Symptoms even frequently appear which aggravate the disease. It seems to us, and it is quite natural to think so, that any interruption in the after effects of the waters, moſt active in this kind of complaint, cannot fail to be prejudicial.

We muſt remember also that deep seated congestions of the spleen and liver always coincide with the decrease of ſtrengh and entire weakness of the system. On the other hand, the Vichy waters are stimulating but

not tonic as has been affirmed, and in whatever way, they may be considered, there is nothing in their chemical composition, to allow them to be considered as such. Then they by continued stimulating action, instead of strengthening, diminish it, and in fine increase the general debility. As also by a prolonged use of the waters, properties by no means nutritive are introduced into the system, and become the cause of further deterioration. And though poisonous effects from alkaline are rare at the springs, still it is impossible to deny that they have sometimes been observed after an excessive use of the waters.

We can cite a case brought under our observation by one of our respected confreres, a safe and eminent practitioner, D^r^ Descieux, of a patient suffering from congestion of the liver who had come twice to the waters the same year. The first season produced most favourable effects, but the patient lost all those good effects by a second visit. He suffered from a gastric and nervous derangement

of a serious nature, attributed at firſt by his physician at the springs, to a softening of the brain, and left Vichy in such a feeble state as to allow little hope of his recovery. A good nutritive regimen, and the use of pure tonics for several months, quinquina and bitters, sufficed with difficulty to restore him.

Jaundice of long or recent standing, disappears rapidly by the use of the Vichy waters, as well as dyspepsia, intestinal complaints and even gastralgia caused by bilious derangement. This action of the waters on the secretion of bile, and in general on the functions of the liver, is one of the moſt remarkable. In a very short time after the waters have been taken, bile, affected in its formation and flow, or altered in some of its properties, undergoes an evident change and recovers its normal qualities. Thus is explained, the great efficacy of the thermal treatment in *hepatic colics and biliary calculi.*

In these cases, the same operation takes place as in that of gravel. The functions of

the liver being stimulated, the waters operate so as to expel the calculi, and the bile being modified in its consistency and rendered more fluid, becomes an obstacle to their reproduction. This action is both purifying and calming. The violence of hepatic colics is often lessened, and in moſt cases, arreſted. This laſt effect is produced even when colics are not caused by the presence of calculi. In any case, after a season passed at the waters, patients observe that the attacks are less frequent, last shorter and are less painful. The patients also acquire greater facility in passing calculi, often of a very large size.

But it is the same with hepatics colics, as with renal colics. The waters, if not administered with great caution, tend to renew them. This is a danger which ought to be avoided, because it is of no use to the patient. In no disease, as we have said, is it more profitable to force nature than to oppose obstacles to her efforts; and the thermal treatment seems to us useful only when limiting

its action to stimulate in a just measure all its functions. The entire strength of the system should be placed in the very best condition to obtain a cure. This is so true that except in some cases in which the gall bladder is full of concretions, hepatic colics caused by over doses of the waters do not in general facilitate the expulsion of the calculi. They only inflict on the patient, loss of strength and useless sufferings, at the same time that they hinder the good effects of the treatment, and delay the cure.

When these bad effects occur, and we must add that it is not always possible to prevent them, the best thing is to suspend the use of the waters, and not to resume them, until the danger has passed away, but custom in such cases is to give the waters in very small doses merely, and after having subjected the patient during two or three days, to the use of baths exclusively.

Hepatic colics constitute a very serious complaint common at Vichy, and which re-

quire to be carefully watched. It is indeed an interesting study in every way, to observe the causes producing the disease, and influencing its prognosis : the symptoms characterising it, and its diagnosis, often difficult to form, when it does not depend on the real existence of calculi : I study the other complaints accompanying it, and those seeming to resemble it, for instance, hepatalgy, and the attacks of gastralgia and gastro-hepatalgy. A great number of physicians still deny the existence of hepatalgy, or hepatic colics without calculi, and on that subject we wish to give our opinion. The labours of M. Beau have however eſtablished this diſtinction in an irrefragable manner.

And why should not the nerves of the liver be favourably or unfavourably affected as well as those of the other organic apparatus ? For our part, the existence of purely hepatic attacks is moſt certain. In accepting, as a general name, that of hepatic colics, we do not believe that it necessarily means that bi-

liary calculi exist at the same time. In other words, we admit the existence of hepatic colics, with calculi and without them.

Daily experience at Vichy showed the truth of this ſtatement, and does so, even when taking into account, the difficulty of ascertaining the presence of biliary concretions, and still more the sand originating them. Many of our confreres, and patients deceived by the appearance of the same symptoms, sudden pain, of a very violent nature, vomiting of bile, and jaundiced colour of the skin, do not wait for the proof of the existence of calculi to declare their exiſtence, and consider themselves affected by them.

This conſtitutes however an error in theory no way affecting the beneficial action of the Vichy waters, but which is moſt important respecting the way in which the waters are to be taken, and the prudent moderation in which they are to be prescribed. We spoke of the return of painful attacks caused by the excessive use of the waters. It is in cases of

hepatalgy chiefly that they appear without causing the expulsion of calculi, which in reality do not exiſt, and to the great detriment of the patients, whose strength is lessened by these useless sufferings. In this case again, small doses become the rule, and the guarantee of success.

We consider it useless, to add in conclusion, that the Vichy waters have no dissolving influence on biliary calculi when existing. Such an opinion is still less founded than in cases of urinary calculi, and neither experience nor chemical proofs can justify those who adopted it, and endeavoured imprudently to circulate it.

DISEASES OF THE UTERUS.

Since M. Michelet wrote in his highly artiſtic manner, the medical and funeral oration of "*l'Amour*" and defined our epoch, as "the age for diseases of the womb" all women became nervous on that point. Such is

the influence of senile literature on the development of diseases! The "*Sorcière*" has juſt completed the work of "*l'Amour*" and since then, these affections have appeared as if by enchantement: and every one repeated with the poet, that now, these diseases are of uncommonly frequent occurence. Not more perhaps now than formerly, but as public attention is fixed upon them, it is an advantage; and we shall have on the one hand, more frequently the courage to comment upon them, and on the other hand, the opportunity to cure them.

The uterus is the organ below the diaphragm, the leaſt directly influenced by the waters; and as in cases of liver diseases, we do not pronounce on their efficacy in the morbid and organic alterations affecting the uterus. Useful perhaps in the commencement of a schirrhous affection, when the general health can be preserved, the waters are not effective in the progress of the disease, and when hemorrhage takes place, they become

hurtful. The waters are ſtill more useful in inflammatory congeſtions, resulting from a chronic metritis, and combined with a deep-seated and extensive induration of the organ. They act however, in an exceedingly slow manner, reducing them; and the waters do not prevent them from degenerating, whenever there is in the patient a predisposition to cancerous affections. The action of the waters is ſtill very doubtful in fibrous tumours conſtituting generally only a local affection without any derangement of the general health. This agrees with what experience has proved, that the Vichy waters act rarely upon the uterus in a direct and immediate manner.

These reſtrictions being made, idiopathic irritations or ulcerations which belong either as cause or result to a congeſtion of the neck: and catarrh also with or without ulceration, which of all affections of the womb are infinitely moſt numerous, and upon which the waters have a moſt remarkable and beneficial effect.

It is well known that erosions and ulcerations of the neck of the uterus, the gravity of which however has been much exaggerated, require an immediate surgical treatment : treated in this way, in the beginning, they can be easily cured, but when they are of long ſtanding, and this is moſt usually the case, they cause great derangement in the general health. The Vichy waters may be used before or after cauterization, better after than before, but they can never replace it. They have not the property of cicatrization, and their action is less effective on the diseased part than on the symptoms which follow.

Moſt women coming to Vichy, have led for a more or less lengthened period, a sad and enfeebled exiſtence, accompanied by suffering illness. They feel a weight in the lower part of the seat, in proportion, as the congeſtion is more or less great and of long ſtanding, heaviness and pain in the kidneys, groin, and thighs. They walk slowly, with pain, and often can scarcely move. This continued

ſtate of suffering generally increases, and may be complicated with hyſterical symptoms at the time of menſtruation, which is always painful. Digeſtion at the same time becomes slow, irregular, and difficult, the abdomen becomes swollen, and windy colics follow. The mind is also affected, and nervous irritation becomes excessive. In this ſtate, it is not rare to see patients retain a certain embonpoint and appearance of health, but in moſt cases, if the disease has exiſted any time, the functions of nutrition become deranged; the skin becomes pale and yellow: and the women are very feeble and emaciated.

It is in those general symptoms which we venture to consider as foreign to the uterine affection, that the Vichy waters, skilfully adminiſtered, are moſt efficacious. The waters act firſt on the digeſtive organs and ſtimulate them to action; digeſtion improves and becomes regular; consequently nutrition being more complete, ſtrength returns; the countenance recovers its colour, and embonpoint

reappears. A few weeks only are often necessary to effect such important changes, and many women leave Vichy unexpectedly and wonderfully improved.

On the other hand, those severe lumbar and inguinal pains gain by the thermal treatment that sedative action which they conſtantly exercise againſt pain, when symptomatic, and not in the diseased organ. And this is a moſt remarkable quality of which we have already spoken, and to which we draw the attention of our reader.

It is a divine work to alleviate pain, said Hippocrates.

Thus the Vichy waters soon put an end to symptomatic pain in dyspepsia, gravel, hepatitis; congeſtions of the liver and spleen and they certainly arreſt the progress almoſt of renal and hepatic colics; ſtill the waters sometimes excite them, because they are not a symptom caused by calculi, and in fact appear to conſtitute a nervous affection. Indeed, they do not calm down, they sometimes increase

the pain, in pure gaſtralgia having for cause and principle, merely neuralgia of the ſtomach.

In the disease of which we now treat, the waters act according to these special conditions. Shortly after women begin to take them, they feel a relief which is already an improvement, and which progressing always, does not fail to bring about a more satisfactory ſtate. They walk with more ease and facility, and while the weakness and heavy pains in the back disappear, a certain diminution in the congestion of the neck of the uterus may be observed.

It was to obtain such results, that the piscine baths were so much lauded, to which however in moſt cases we prefer simple baths, the horizontal position being especially the best in these diseases. It is necessary also that these baths, in order to be effective, should be prolonged for some time, but it seems to us difficult that persons should submit without inconvenience, to a daily immersion of five hours: patients already enfeebled; and though

in certain cases, this form of bathing has appeared advantageous, there are to our knowledge, a great number of inſtances which prove that such extreme treatment is more injurious than useful.

However, in the midſt of those changes so favourable, whilſt the ſtrength returns with embonpoint, and the painful symptoms cease, the local affection is not modified. The fissures and ulcerations, superficial or deep seated, simple or granulated, remain ſtationary and the flow of leucorrhœa continues with the same abundance and of the same qnality. The Vichy water we have already said, have not any cicatrizing effects. Thermal treatment is here ineffective, and without any influence on the altered position of the uterus which accompanies frequently the disease. But it will be easily understood that by the happy effects of the thermal treatment on the general health, it assiſts powerfully the surgical and hygienic treatment in bringing about a cure.

The principal difficulty in diseases of the uterus is to enable patients to support the thermal treatment. Many women conſtitutionally irritable, become ſtill more so, owing to their prolonged ſufferings and debility. The waters in many cases increase their nervous excitement and cause derangement. The waters muſt be given with caution and in small doses. The great quantity prescribed by some physicians in order to reduce the uterine congeſtion, which does not give way, is always an obſtacle to the success of the treatment and a danger to the patient. It is under these circumſtanccs particularly that severe nervous attacks are observed, and which become hyſterical, sometimes increasing the sufferings of the patients, and bringing on considerable depression.

There are also a certain number of women affected or threatened with hyſterical disease who probably will find the malady to increase under the action of the waters. In general, these cases appear to us a counter-indication

of the treatment, and when after a few trials made prudently, the patient cannot bear the waters, the beſt plan is to give them up.

And in any case, we cannot repeat it too often, how much care and attention muſt be exercised in uterine diseases! We have already said that the uterus is the thermometer of the health of a woman: when it suffers, all the organs suffer.

The physician muſt search and feel his way carefully. He muſt be cautious in the choice of the spring, and the manner in which the waters muſt be used. He muſt ſtudy the case attentively, and watch the slighteſt and moſt trivial symptom, combining with thermal treatment, a moral one also. He muſt keep up the spirits of the patients so as to enable them to bear up againſt that inevitable depression conſtantly depressing them. The organisation of a woman is a wonderful combination of physical delicacy and moral sensibility, which if loſt sight of, a cure becomes impossible.

DIABETES. — ALBUMINURIA.

If diabetes were, as Mr Mialhe affirmed, the result of a deterioration in the chemical properties of the blood, which has lost its physiologically alkaline qualities and become *neutral* or acid, the alkaline waters of Vichy would certainly constitute the best remedy that could be used against it and would act as a certain specific.

It is with that hope besides that we see coming to Vichy every year, so many diabetic patients, and that we see them drinking the waters in the moſt unreasonable and imprudent mamer.

Unfortunately, Mr Mialhes theory, which is an exclusively chemical one, assimilates too nicely the operation or the living being with those of the laboratory and like that of Mr Petit on the gout, it is based on an entirely erroneous fact.

The blood of diabetic patients was never found to be acid or neutral no more than uric

acid was found in the blood of gouty patients. M. Bouchardat on the contrary proved that in diabetis it preserves the slight alkaline properties which characterise it physiologically and which besides, do not appear sufficiently active to destroy, as M. Mialhe pretends, the sugar which is formed in the system, in a healthy ftate, and by this means prevent the disease from being produced.

A miserable theory which the prick of a lancet causes to collapse!... M. Mialhe, it is true, will not admit the fact. But what a strange thing is that passion, I shall not say for paradox, but for error, evident and well proved error, which takes possession of certain minds, in other respects of a high order, and makes them blind, audacious, and obstinate!

It is in fact a sort of mania for invention or rather for fame...

However it may be, the experiments of M. Bouchardat proves that the Vichy waters are not the specific remedy for diabetes, and

therefore far from being able to prescribe them with the assurance of obtaining a cure, no other than calming effects can be expected from their use. But on the other hand, these effects are not without being advantageous, and clinical observation, without the necessity of further theory, allows us to affirm that they have in these cases a salutary action which it would be useless to look for in any other remedies known. *Non si trova il medico, ma si trova la medicina.*

Among other symptoms more or less variable, diabetis presents three that are always constant and which exiſt without feverish symptoms :

The passing of water daily, in large quantity, colourless and emitting no smell :

A strong feeling of hunger :

Great thirſt.

Added to those, the presence of sugar in the urine, which is, if not the pathognomonic, at leaſt moſt characteristic sign of the disease.

I do not intend to give here a long history

of the symptoms of diabetes, and I willingly set aside all the phenomena, which, when the existence of the disease is proved, may show themselves after : such as derangement in the viscia, a decay in the functions of the organs of generation, want of sleep, general phenomena, lassitude in the limbs, fatigue, a sensation of general debility; cachetic phenomena, such as swelling of the extremities, gangrenous excoriations and ulcers, which were without reason endeavoured to be made into a novelty in the disease, a seperate type.

Diabetes is a disease essentially of a debilitating nature which can be vigorously and for a long time resisted, but under which, if great care be not taken, the constitution is undermined by the gradual absorption of the strength, the want of vitality leading sometimes, according to the peculiarities of conſtitution, the patient to a ſtate of decomposition of which the gangreneous sores are the striking proof. But whilſt the firſt symptoms conſtitute the disease, the latter show its dif-

ferent stages and can only bring particular modifications to the treatment by the thermal waters.

As for inftance, when by chance, and from no matter what cause, a diabetic patient gets a fever, the Vichy waters are injurious and should not on any account be employed.

These things being noted down here in the way we saw them acting in combating the principal symptoms :

We, treated at the Vichy hospital, a certain number of diabetic patients; they were submitted to a moderate use of the waters, and to a strict regimen, with regard to diet : animal food exclusively, with gluten bread, a double allowance of wine, and food. In all cases, after eight or ten days treatment, we observed a marked decrease in the quantity of sugar in the urine, though the patient did not appear to improve nor was there any beneficial change in the general health. We made this observation, because we do not consider that the quantity of sugar should be taken as the moft

certain sign by which the degree of intensity of the disease should be judged. We attribute on this point a far greater degree of importance to the other symptoms, hunger, thirſt, the abundance of the urine. There are in fact a great many causes besides the pathological ſtate of the patient, which may make the quantity of sugar vary, and among them the principal one is the diet.

For this reason we are in the habit of analysing the urine passed, always at the same moment every day, in the morning and when fasting; a remarkable instance, which we can give in support of this opinion, or of the little value to be attached to the greater or less quantity of sugar found in the urine, is that of a young soldier who came to Vichy, in a moſt emaciated and debilitated ſtate, affected with a feeling of great hunger and thirſt and whose urine, passed in large quantities, gave a quantity relatirely small (20 grammes) of sugar. From the firſt day of the treatment, and no doubt owing to the combined action of the

waters and the diet, the proportion of glucose diminished rapidly, so much so as to become scarcely perceptible under the action of reagents without however ceasing to be so; but the other symptoms continued and when the treatment was finished we could only observe a very slight improvement in the general health of the patient.

It was only towards the fifteenth or twentieth day after taking the waters that the feeling of hunger seemed to be affected and modified by their influence. We have on this sulject rather precise observations based on the daily prescriptions of drink and food given to the patients.

At about that time they begin in general to feel their thirſt allayed, and we think that if the dryness of the mouth and the inclination to drink appeared to have become less in a short time, in the appreciation of this fact it appears to us of the large quantities of mineral water which certain patients consume, a

means quite as good us any other for moistenning the throat and slaking the thirſt.

It is in fact difficult to understand to what frightful excesses the poor patients sometimes abandon themselves to, and what an enormous quantity of water is often prescribed for them : drinking large glasses full of the water by day and by night, but prescribed by and with the permission of a physician, which is a sad thing, 30 and even 40 grammes of bicarbonate of soda every day... No doubt under such treatment the thirſt may be allayed in a shorter time; it is not even allowed time to come, but it is deplorable and we muſt have the courage to say so,

At the same time, from the fifteenth to the twentieth day, in following a moderate treatment, the abundance of the urine diminishes; often at that period it has lost all trace of sugar, is a little coloured, and acquires a slight smell at the same time, the strength revives, the constitution is restored, the defects in the sight disppear; in one word the disease is

checked in its moſt serious symptoms, and the treatment terminates by a great and general improvement.

We do not think that more can be expected from the Vichy waters in diabetes, and it frequently happens that such satisfactory effects do not result from their use.

That is particularly observed when patients have delayed too long in coming to try the treatment. After and from the effects of the salutary ſtimulus which the conſtitution recieves, the disease if it be a recent one, and properly attended to, may never return, but in moſt cases after a certain time, more or less prolonged, the sugar again makes its appearance in the urine.

This abatement in the symptoms is nevertheless a happy result, particularly as it may be renewed every year, by a return to the waters, and thus attenuate almoſt in an indefinite manner, the ravages of a disease always of a serious nature, and the radical cure of which can with difficulty be admitted. We

muſt however, for the encouragement of patients, give an authentic case of a cure of diabetes, by the use of the Vichy waters. A case observed and published by D.r Contour. It is we believe the only well eſtablished cure of this disease.

Albuminuria. — In our firſt edition on the subject of *albuminuria* we expressed ourselves as follows: " Our opinion respecting the action of the Vichy waters in albuminuria requires further experience. We saw them sometimes contribute greatly to bring back loſt ſtrength, and to cause an evident improvement in the special symptom of the disease, but we also observed them to be without any effect on the production of albumen in the urine, and in other cases bring on an increase of anasarca. We believe however that they may render service in those cases particularly in which it is important to improve the digeſtive functions, and that when prescribed in small doses moſt useful soothing effects may be expected. "

Further observations allow us now to confirm fully our former ſtatement. The Vichy waters act in albuminuria as in diabetes, except however on the morbid and characteriſtic production of the disease, which they do not deſtroy as rapidly as they do the sugar.

On the contrary, they affect it but with difficulty and always in a slow manner, which is in this case of great importance. — But a general improvement takes place in the conſtitution in moſt cases, and the disease is, if not cured, at leaſt seriously retarded in its effects. The cure itself does not appear to us impossible; all depends on what the cause is.

There is in this, moreover a subject we may even say unexplored by serious ſtudy, and to which our attention has been for a long time turned, and which we intend to treat with that particular and serious importance which it merits.

MODE OF ACTION OF THE VICHY WATERS.

After having rapidly pointed out the efficacy of the waters, in the different diseases treated at Vichy, we ought perhaps to explain in conclusion the way, in which these beneficial results operate; in other words to define the mode of action of the waters. It is on this queſtion, that within the laſt twenty years, so many new medical theories have appeared, the leaſt inconvenience of which is, to be as chimerical as useless, and which have been moreover the great obſtacle to safe medical practice at Vichy. We shall not connect ourselves in any way with such delusions.

A good reason for avoiding them is, that a man does not succeed always in preserving his own sense and in keeping aloof from absurdity when he applies himself to such labour We read in several pages of a work published on the way the Vichy waters act upon our diseased organisation, an action which is *specific*, *alterative*, *purifying*, *reconſtituent*,

tonic, hypoſtenisant, exciting, sedative, counter ſtimulative, antiphlogiſtic, plaſtic, antiplaſtic; that they *purify* the blood, that they *soften* the tissues — that they *clean* and that they wash.

The reader will say to himself what he thinks of this; for our part we ask ourselves of what use all these things are, except to frighten our confreres, and to drive patients from the thermal springs. Unless the object was, in writing such things, to make a show of great ſtrength and to prove that if the colossus of Rhodes were ſtill exiſting, inſtead of an earthquake, Vichy water would have sufficed to upset it.

The Vichy waters, exclusive of their chemical composition, which gives them no specific property, have a three fold action well characterised and nearly invariable, on all people using them.

Taken as baths, they excite the surface of the skin, and bring back, by ſtimulating them, the functions of the skin.

In the interior they produce a similar effect on the gaſtro-inteſtinal mucous and on the digeſtive functions which under their influence become regular.

That is, they act directly, to give them vigour on the entire system of nutrition, on the powers of assimilation and of elimination, and from these qualities, they muſt be considered as one of the moſt powerful remedies for the human system.

That suffices we believe to make it underſtood that they are moſt salutary in the greater number of chronic diseases in which the functions of which we speak are nearly always almoſt extinct or disordered.

CHAPTER THE FIFTH

VICHY WATERS EXPORTED FROM THE SPRINGS.
SALTS FOR BATHS AND DRINKS.

If we have sufficiently explained our object in writing this work, and our opinions relative to the treatment of disease by thermal waters, we need not say in what diseases they are used, and what therapeutic advantages they offer.

We only ſtate the fact that they are very often prescribed, and in moſt general use. — As a truly valuable therapeutic remedy, nothing in so good as the waters of Vichy, taken on the spot.

When however, a patient cannot come to Vichy, to try to be cured, it is natural enough

and it muſt appear useful that the waters should come to him.

These cases refer particularly to invalids living in diſtant countries or beyond the Atlantic. In warm climates, in Africa, Asia, India, Portugal, Italy, Spain, moſt certainly, the Vichy Salts are moſt useful, and render great service.

This kind of treatment moreover is not new; it would be more juſt to say that it became obsolete, and was given up for a long time.— It is well known that Louis the 14th at the age of fifteen took the waters of Forges at Fontainebleau. In our countries whenever in the interval between two seasons, an attack of uric diathesis occurs, the Vichy waters (exported) are prescribed on account of their great alkaline properties : and they should be preferred to all combinations or solutions of artificial bicarbonate of soda.

Nature, without wishing to throw discredit on our laboratories nor offend any one, is the firſt of all chemiſts.

But in these cases also, the exported waters do not cure; they give relief, they are in a high degree of a calming nature: and that suffices to make them valuable. The exportation of the Vichy waters, by the present adminiſtration, has considerably increased every year, and seems likely, to become more considerable. It is true that the Company did all in their power to obtain such a result, and spared no trouble in doing so and giving the necessary guarantees to the physician and the patients.

We owe to the kindness of M. Callou, Director of the Company, the following ſtatiſtics, relative to the exportation of the waters in bottles, for several years. We publish it as a useful document.

Table showing the different quantities of the Vichy waters exported yearly since the springs of the State were farmed to a company:

YEARS.	BOTTLES.	YEARS.	BOTTLES.
1853 —	380,150	1860 —	1,058.450
1854 —	487,705	1861 —	1,228,500
1855 —	547,900	1862 —	1,341,000
1856 —	658,800	1863 —	1,544,500
1857 —	709,300	1864 —	1,737,500
1858 —	766,500	1865 —	1,920.000
1859 —	968,750	1866 —	2,041,400

The springs of Vichy most used for the exportation of the waters in bottles are the cold ones. The reason given for this preference is, that their low temperature allows them to preserve better their carbonic acid, and consequently they remain longer without being decomposed; two reasons which appear to us erroneous and due to a want of attention.

The first has no importance, and might be replaced by this truth which we have already given as an axiom : that cold springs are all more impregnated with carbonic acid than hot ones. If therefore they are found more effervescent, after being exported, it is not because they have preserved *more completely* their gas, it is because in reality they contain more

of it. The second is a more serious observation and requires to be ſtudied.

In the firſt place, when a deposit is formed in a bottle of Vichy water, that certainly shows there is decomposition, and consequently evaporation of carbonic acid gas.

The fact is certain and cannot be otherwise explained, whether the gas in evaporating caused the decomposition of the water, or whether the water in decomposing produced the evaporation of the gas. But that is the diſtinction that muſt be made and what muſt be ascertained; it is, that the escape of carbonic gas if it is always the result or the proof of the deposit which is found at the bottom of the bottles of Vichy water, is not however the only deciding cause of it.

Let us suppose two bottles taken from two springs of about the same temperature, the *Celeſtins* spring and that of *Hauterive* for inſtance, but of which, the firſt contains a quantity of carbonate of iron less than the the second; after a lapse of time more or less

long, a ferruginous deposit may be seen at the bottom of the latter, whereas the other would remain quite clear; which would seem to prove that the dissolution of the Vichy waters does not entirely depend on the temperature and on the cooling of the water. — Why besides should the cooling of a warm spring be an active cause of the evaporation of its gas but that it depends also on the very nature of their respective composition. And on the mixture more or less perfect of the elements which they contain. Thus, the salts of iron, being the least soluble of all those which enter into their composition, are also the least easily disaggregated, and the springs which possess in greater quantity are the first, despite all question of temperature, to leave a deposit at the bottom of the bottle. And I here make the observation, rather singular in the present question, that these springs are all among the coldest of Vichy.

Now, M. Bouquet in his chemical observations on the Vichy waters, admitted that

the escape of carbonic acid takes place inſtantaneously in the open air in each of the springs.

There comes a firſt jet, very abundant and which laſts scarcely a few seconds, after which the escape of gas ſtops suddenly, and is only reproduced later, as the waters are decomposed.

We call attention to this proposition which no one thought up to this time to turn to account, and which moreover experience confirms.

The *Mesdames* spring (cold temperature of 16 degrees centigrade) springs up at about 1,500 metres from Vichy, and from this point, a leading pipe brings its waters from it to the gallery of the springs of the thermal eſtablishment. Now if we examine the interior of this pipe, we should find that it is lined from its departure and only at a length of two or three metres with thick a chalky layer, a certain proof of the inſtantaneous evaporation of the gas, and of the deposit of the salts of

iron. But beyond the diſtance of three yards, the interior of the pipe does not offer any further trace of this deposit, and the waters pass over it in all its length without losing anything and without decomposition.

This proof being evident of the sudden evaporation of carbonic gas, and as the cold springs lose it as easily and as quickly as the warm springs, is it not evident that their low temperature could not aſſiſt in preserving exported water? The real process to employ in order to obtain this preservation, is to shelter the waters from the air, to fill the bottles well and to cork them firmly (1). In these conditions all the Vichy waters can be exported; the warm springs are preserved as well as cold ones, and it is a miſtake to think of attributing therapeutic indications if any be

(1) I give the administration another good precaution if they will sacrifice a little elegance to what is useful and introduce into the system of exportation an excellent innovation consisting in protecting the waters from the light by covering the bottles with black or blue paper.

found, to a supposed influence of the temperature of the springs.

Experience is there however which decides the queſtion definitely, and the Vichy Company possesses in its ſtores, bottles of water taken from the springs several years ago, from the warmeſt of the Vichy springs, those of the *Hopital* and the *Grande-Grille*. These are as clear and as well preserved, as the waters of cold any spring of Vichy.

*
* *

The use of the natural salts of Vichy for baths, is not less known, than that of the exported mineral waters. From our experience, we think, it presents even more therapeutic applications. The thermal eſtablishment which exports such a large number of bottles furnishes ſtill outside, about thirty thousand kilogrammes of salt yearly. An important fact here presents itself and which deserves to fix the attention.

The Vichy baths are not in fact ordinary

alkaline baths. They may always replace these latter in the necessities of general practice, but they cannot be replaced by them, particularly when the patient, prevented from coming to the thermal waters, is forced to make at a distance a sort of thermal cure. In these cases, it will be easily understood how useless is a simple dissolution of bicarbonate of soda in the water of the bath and how important it is on the contrary, that the natural salts of Vichy should give the entire constituents of the springs which supply them, and of which they should combine as much as possible the mineralising properties; and why their preparation for this object should be exact and carefully watched over.

There are two ways of preparing the Vichy salts, one which is quite worthless, and the other which is an excellent one.

The first consists in bringing the mineral water to 24 degrees of the aerometer, and then taking it to the crystalising pan where it is left to rest. The salts are then deposited

in angular prismatic cryſtals, the principal defect of which is to contain only carbonate of soda, and little or none of the other salts contained in the water. We muſt beware of these brilliant productions. They are exhibited in shop windows. They are pleasing to look at and pretty, but we repeat they contain simply carbonate of soda. They are used for the preparation of artificial Vichy water, to which the natural water of Vichy should be always preferred.

The second way of preparing them is the one which the thermal eſtablishment employs in its laboratories, to obtain the salts intended for *baths*. In this case the extraction in made by *diffused criſtallisation*. The word explains clearly the thing and shows that there is a complete mixture of the mineralising properties of the waters. The mineral waters are brought to 34 degrees of the aerometer, the fire is slackened, and the saline cryſtallization operates afterwards naturally at the bottom of the evaporating bath. It is easy to underſtand

that all the salts contained in the waters thus evaporated are then contained in the residue. And if the cryſtals obtained are less brilliant than those of the pure carbonate of soda, used in trade, they have the valuable advantage of giving the full subſtance of the mineral properties of the water. We shall not dwell on the therapeutic consequences which result from this fact.

The salts thus prepared, are exported by the Vichy Company, in bottles or ſtone jars; or they use them in the manufacture of Vichy *paſtilles*. In all these operations, a miniſterial decree of the 2nd of March 1857 placed them under the ſtrict surveillance of a commissary of the government at the thermal eſtablishment, who watches over the extraction and despatch of the products. There is not a single box of paſtilles, not a flask, leaving the laboratories of the Company, which should not bear the mark of this verification, and of this surveillance, so that the natural salts of Vichy are not disposed of for consumption, except

with the double guarantee of a good preparation and the *government ſtamp*. This is an excellent measure, which is certainly better than all the patents, without the guarantee of the government, intervening in this way between fraud and the public health; we can only applaud.

AXIOMS.

1. The Vichy waters are gaseous, alkaline and thermal in various degrees.
2. There are twelve springs at Vichy eight natural and four artificial.
3. All springs have the same physical properties.
4. They only differ materially from each other by their varied temperature; it is the difference in heat that gives them different taſtes.
5. In the same way all the springs have the same chemical properties, and are composed of the same ingredients. The quantity of these ingredients alone varies, but in very small proportions.

6. In all, bicarbonate of soda conſtitutes the predominant ingredient, and they contain about five grammes to the litre.
7. They are largely impregnated with carbonic acid, of which they contain in a mean proportion half a litre per litre.
8. All the natural springs are warmer and more abundant, the *Celeſtins* source excepted, and more mineralised, than the artificial ones.
9. The artificial springs contain more carbonic acid in a free ſtate than the natural springs, the source *Lucas* excepted.
10. In the natural springs, the quantity and the temperature are always in direct ratio, that is, that they increase or diminish at the same time, and among these springs the moſt abundant in water are the warmeſt and vice versa.
11. The same connection and the same law do not exiſt for artificial springs.
12. The Vichy waters are used externally and internally, as baths, douches, and

drinks, but it is requisite to use them in one or in the other of these forms.

13. The thermal cure is not of 21 Baths or 21 Days; it has no fixed time, no absolute rule; it depends on the patient and on the disease.

14. No spring at Vichy possesses any peculiar specific property, and they can be used, one after another, in all diseases.

15. The special effects attributed to some of them may be considered as useful to follow from certain facts proved by experience, but there is nothing positively certain.

16. In all cases, the best spring for the patient, is the one he supports best.

17. The Vichy waters are a stimulating, and not a tonic medicament.

18. Bicarbonate of soda is the predominant mineral ingredient in their chemical composition, but it is not the specific agent, the essential and only one acting as a therapeutic agent.

19. The Vichy waters are only employed in chronic disorders—and only in those affecting organs below the diaphragm.
20. They should not be used in affections of organs above the diaphragm.
21. They are curative in gravel; vesical catarrh; affections of the inteſtinal tube; of the liver; the spleen; in hepatic colic; paludal cachexia; chlorosis, &c. &c.
22. They act as a preventative, and have a moſt soothing effect in gout, diabetes, and albuminuria.
23. In gout, in diabetes, &c., their soothing effects are superior to that of all other mineral waters, and of all known remedies.
24. The Vichy water, to be effective, should be taken in small doses.

THE END.

REMARKS

ON THE UTILITY

OF MEASURE GLASSES

(VERRES GRADUÉS)

FOR DRINKING

THE VICHY WATERS

AT THE SPRINGS

MEASURE GLASSES

FOR DRINKING

THE VICHY WATERS

The following remarks first appeared in a pamphlet two years ago, and obtained for the object for which it was written, the warmest reception.

We asked that there should be at Vichy, as there are in several other thermal establishments, *measure glasses* (verres gradués) intended to give the patients and physicians correct information relative to the quantity of water taken and prescribed. How otherwise could thermal therapeutics be seriously applied and appreciated!

The Vichy Company had the same year measure glasses placed beside all the springs, and the public pleased, we can affirm, with

this innovation, beſtowed their favour on it. In adding to this volume, the present notice, which completes it, we have not thought fit to modify it in any way. The subject has not become obsolete, and has loſt none of its importance; in matter and form the brochure remains what it was.

C. D.

REMARKS

ON THE UTILITY

OF MEASURE GLASSES

IN DRINKING

THE VICHY WATERS

AT THE SPRINGS

The Vichy waters, to be effective, should be taken in small doses. (*Axiom 24.*)

I conclude, by this short notice on the introduction and utility of the *measure glasses*, the work which I begun, at Vichy, four years ago.

To endeavour to maintain for thermal medical treatment, the serious and scientific character to which it has a right, and to reject the morbid theory of acids, and the pretended dissolving and fluidifying properties of the Vichy waters :

To oppose in the administering of the waters the deplorable system of *saturation*, and the dangerous one of giving large doses :

To recommended strongly on the contrary, small doses, supported by chemistry physiology, and common sense, and to make it

triumph with the firſt rules, and the moſt elementary notions of therapeutics.

To bring to an exact and precise meaning, the vague and uncertain sense of the word *doses*, small or large, and to replace in medical prescriptions, the glass, too uncertain and varied, by a measure of exact weight and capacity, invariable and scientific; — the *gramme*.

In reality, the task I underſtook, may be reduced to the laſt proposition; to ascertain the exact quantity of water prescribed and taken.

Its great importance and scientific value depend upon that fact, and the use of the *measure glasses* will be the practical result.

And that task so modeſt as it is, I feel a pleasure in mentioning it, because, from beginning to end, I have accomplished it; inspired by those two sentiments on which I pride myself; the intereſt of science, and the intereſt of the patients.

The introduction into the Vichy springs of the *measure glasses* giving the exact measurement by the gramme is an innovation which I hope will, as originated by me, be conteſted by no one. — And on this subject, I own I

am scrupulous, and I would not wish to be accused of taking even in thought, and certainly less ſtill by the slighteſt word, what belongs to others.

So when one of our confreres endeavoured laſt year, to take from me that priority in the system of small doses, and the measuring of the quantity of water by grammes, and acted so because he knew by the very brochure in which we attacked the theory of acids and saturation — which are his own theory and his mode of treatment — that Claude Fouet in 1856! had recommended the Vichy waters to be taken moderately; truly this is not fair and ſtill less juſtice and truth. Did we not ourselves give the ſtatement! and here are our very words :

« He (Claude Fouet) took great care not to infer from his doctrines the fatal consequence of those immoderate dranghts which are so much praised at present, and the saturation of the patients by the Vichy water (1). — In order to be fully successful, he says, a little only muſt be taken daily, and by this means the patients are always relieved and never

(1) Critical letter on the pretended dissolving and fluidifying action of the Vichy waters.

injured, they have the benefits of the waters and not their injurious effects. »

The real truth is that Claude Fouet was the firſt to imagine that the acid was at the same time the "*Fils ainé du soleil*" and the sole cause of all our diseases! Such is his theory. You have taken it from him without either knowing it or naming him; you — I mean all the successors and partisans of M. Petit.— Claude Fouet moreover recommended patients to drink very little of the water daily.

It was his mode of treatment which you despised. I took it from him, knowing it, and naming him; and I rejected his theory. That is the difference between us — I mention it, and that point we may argue. When another of our confreres, much bolder but not less a partisan of M. Petit's doctrines, after having publicly proclaimed that the Vichy waters dissolve the biliary calculi; I repeat, the biliary calculi! a three fold chemical physiological and pathological heresy — when, I say this second confrere all of a sudden, laſt year, recommended small doses; and did so as if they had originated with himself; here again there was a want of fairness, and a great absence of candour and sound reasoning. Let us give once more a few dates.

It was in 1860, that after thorough personal experience, and numerous observations carefully collected in the exercise of my duties, a year before, at the thermal military hospital of Vichy — in 1860 I began to conteſt in the adminiſtering of the waters the saturation syſtem, then alone in vogue and I ſtated as a principle, under the form of an axiom : *that the Vichy waters to be effective should be employed in small doses.* — It is the 24th axiom (1) which since has served as an epigraph for all my other publications.

In 1862, in a work entitled " Scientific and medical remarks " which was deſtined to become popular (2).

I wished to give to the doses, a precision and a therapeutic value, which they did not possess, and I gave as a *maximum* quantity. 700 to 800 grammes of water, per day; which the patient could take with profit.

Our honorable confrere on his side, wrote the same year (1862) the following lines, which to say the leaſt of them are a ſtrong, but rather simple conviction.

(1) The Vichy waters 1st edit. etc.
(2) Album Vichy-Sevigné. Vichy-Napoleon.

I believe I have "*demonſtrated in a clinical point of view* the truth of the theoretical opinion expressed by that skilful observer (M. Petit) on the possibility of the diſſolution and disaggregation of biliary concretions." To this I answer *en passant*, that such *clinical* achievement requires in a logical point of view, another — that of prescribing patients to dry up daily the *Grande-Grille* and *Puits-Carré* springs; I muſt observe, that biliary concretions are nearly always formed by choleſterine, a fatty subſtance which can certainly be diſſolved, in ether or chloroform, but which *are not affected by alkali;* I do not think it is necessary to add, that the Vichy waters are alkaline, but do not contain an atom of ether, or of chloroform, and I continue.

In 1863, supported by longer experience, and a better grounded conviction; I published againſt *the pretended diſſolving and fluidifying action of the Vichy waters*, and againſt the saturation syſtem a *Lettre critique* which was the result of six years observation, and three years of discussion.

I published also the second edition of my work, *on the mineral waters of Vichy*, and

in both of those publications, I had conſtantly in view, the 24th axiom; I gave it in almoſt every page, in the beginning; in the middle: and at the end; and even on the very cover of the book, in the place where Montaigne wrote "*Cecy eſt un livre de bonne foy.*"

Now it was in 1863 that this same confrere, forgetful of the *truthful theories* of M. Petit, and the dissolution of biliary concretions, *clinically* demonſtrated, surprised us not a little by saying:

"Too long in my opinion, they have made an abuse of this mineral water, so rich in soda!..."

And this also!

"In order to obtain a cure at Vichy, it is necessary to give but small quantities of the mineral water as a drink."

Thanks, my dear confrere, for this opportune conversion; I compare it to a certain fall on the road to Damascus; but with your permission I sign as near as possible, that the public may know, that the words of doctor Willemin are those of doctor

CASIMIR DAUMAS.

January 1864.

To the Director of the thermal establishment at Vichy.

SIR.

You are at the head of the firſt thermal establishment of France, possessing numerous administrative functions, and great power; you have beyond the restricted medical obligations imposed on you, by the concessionnal decree, liberty to act or not to act.

As far as what concerns yourself, it would perhaps be wrong to complain. Under your direction the Vichy establishment has become the moſt complete bathing place in Europe, and thermal therapeutics owe you assistance and support, which will contribute powerfully to its success.

Everything relative to the fitting up of the springs, sanitary arrangements, and the care and attention given to the bathing cabinets, the activity of the service, the comforts of the patients, and the different things necessary in thermal treatment, form the object of your constant and careful solicitude. There-

fore I feel authorised to call your attention to the use of measure glasses "*verres gradués*" measured by the gramme, and to ask you to give them a place in the different drinking springs of Vichy. You can do so, sir, and I hope you will.

I have juſt explained the reasons in the intereſt of science which make me wish for this innovation. I have now only to support them by some proofs. But before doing so, I muſt beg to add to it something more, and to accomplish a duty.

TO DOCTOR ALQUIÉ

MÉDICAL INSPECTOR OF THE VICHY WATERS

My dear Master and honoured Colleague,

You will perhaps be surprised, that upon this occasion, I did not request the support of your hand, or solicit your patronage. I admits that it was my duty, and I also assure you that it was my earnest wish to do so. It was an appropriate occasion to offer a well merited tribute to that lengthened career of honour, devotedness, and labour, of which you give us such a noble example and to which we should pay great respect.

But why endeavour to contend againſt the present state of things; to deny its existence will change nothing. When a decision taken by the authorities causes an umerited change of position can there be a more dignified proteſt on the part of those injured by it, than to be the firſt to submit and ackowledge it. I shall explain.

The regulation of 1860, relative to the thermal establishments of France, has materially lessened, we muſt admit the therapeutic importance of mineral waters, and increased the powers of the adminiſtration.

The 15th article of this regulation making the patient entirely independent of his position has inflicted a severe blow on the moral influence of the medical body, and consequently on the medical inspector, its chief. Never was the medical practice everywhere honoured and respected more seriously insulted. It is in fact a complete denial of the rights of medical practice : a fatal decree condemning it as useless.

I experience a sort of satisfaction in thus dwelling on the blow inflicted, and measuring the depth of the wound. What in truth is the present state of things at the thermal springs even restricting ourselves to Vichy : Invalids calling for the waters, insisting on getting them at their own risk and peril, and for their money : an administration possessing all rights, except that of refusing the water : in fine you my honoured master, saved by your justly merited reputation from being left entirely powerless.

According to the new regime of the thermal establishment, the powers of the Inspecting physician, seem to be merely to watch over some administrative measures, and the sanitary regularity of the service.

Consequently, medical treatment is not absolutely a necessity at Vichy. The majority of the patients have ceased taking baths as a curative agent. They wash and plunge into the waters at every risk. It is individual liberty, well established unquestionably, as the author of the reform of 1860 intended, but it is simply the liberty to commit suicide.

I already judged in its proper time this reform, and the famous article 15, with sincere conviction and independance.

Entirely engrossed at the time with the fate of the invalids thus left astray by their natural protectors, I had predicted that Vichy was about to become a school for fatal disappointments and deceptions; but I might have added with equal truth that the injury inflicted on medical practice, would inevitably affect the position of medical inspectors, and have them eventually set aside.

The question as you are aware my dear and honoured master, was soon brought forward;

it is now more than a year ago, since it was discussed, and the reason alleged was, that such a functionary had become useless. The little aquatic journals, took up the subject, and endeavoured with their heavy prose to ridicule the functions of Inspector, then threatened. This is progress! And yet we are sometimes, told that society progresses?

Henry the 4 th appointed the first inspector M. Oader, to correct the abuses at the waters; at present people wish to suppress the office of inspector, and this is done under the pretext of *liberty!* Well I do believe that the earth turns round, and I fear that it turns mens'heads.

It has even been stated that some members of our body, regular physicians in fact, mixed themselves up in these discreditable proceedings and even used their pens for attacking the work of Henry the fourth; forgetting no doubt that with its restricted powers medical inspection, is not less a guarantee for that administration which calls for it. It is a security to the public and to the medical profession a honoured standard, to which for my part my respected master I will adhere, and I shall do

so the more willingly that I respect sincerely the hand that holds it at Vichy.

Thus the State, the sole master of our springs having conceded its rights and privileges to a company which is the chief authority at our thermal waters. This company controls the service of the "*buvettes*" distributes the waters to an entire population of so called free patients. I was obliged in the intereſt of science, to resort to this company and its Director in order to claim the highly useful reform of "*measure glasses.*"

Now my respected maſter be good enough to accept as a particular mark of deference the following observations. In adressing you I need not insiſt on the utility of *measure glasses.* — It is evident the word proclaims the thing itself. But I should perhaps defend the syſtem of small doses, this child of my convictions as I call it, of my therapeutic education, observations, and effects. I acknowledge however, with regret, that although you have neither queſtioned the principle upon which it is based nor the experience which confirms it, you have not yet unreservedly adopted it, nevertheless I call your attention to one of its moſt beneficial results namely.

the more correct idea people now entertain of the Vichy waters and the fear of their immoderate use now becoming more universally recognised, which contribute to make the syſtem of small doses the antidote, if I may say so, of the regulation of 1860.

You are aware, dear Maſter, that the doctrine of saturation, which degenerated into a passion, had together with the immoderate use of the waters, produced the fatal belief that they were harmless in their effects. Therefore, under such circumſtances the liberty given to all to drink and to bathe without reſtraint, might perhaps be accepted as the juſt condemnation of erroneous medical theories, but the result was that it actually threatened to become a public calamity.

There was under these circumſtances a danger to parry, and a change to be made in public opinion.

It was necessary to deſtroy prejudices, to direct properly the confidence and correct the error of the invalids, to let them know the energetic and powerful action of the waters of Vichy, the bad results which their abuse and even their use, produced, when not correctly prescribed. In this way the practice of mede-

cine, even misunderſtood and condemned, carried out its noble mission and accomplished its work of humanity.

If you will kindly, my honoured maſter, concede to me, exclusive of the theoretical queſtion, that the syſtem of small doses achieved this firſt and important result, you will have awarded to my researches their moſt valuable recompense. I shall wait more patiently then for their inevitable scientific triumph. The firſt duty which Hippocrates imposes upon the physician, is not to cure, but to avoid injuring the patient: ***non nocet.***

I resume, Monsieur le Directeur, or to speak more correctly, I finish the short exposition of my reasons in favour of the *measure glasses*.

It will not be difficult for you to understand in what the measure glass consists. It is the ordinary glass made to contain a certain dose, and invariable in its dimensions.

As measurement it is the gramme, the recognised unit of weights and measures which is used. This glass is divided afterwards into two, three, or four parts, equal in size, to form the half, third, or fourth of a glass: that is all. It is like the invention of the wheel-barrow (brouette) that the simplest people pretend to despise.

But if the idea of *measure Glasses* be simple, its application is not equally so. And on this question I point out something of

very great utility. It is nothing less than to give to the thermal treatment a clearness and precision which it now wants; and a scientific importance which it is far from possessing.

In a former publication I frankly said in speaking of thermal treatment, that it had neither fixed rules nor method in its application. The same frankness forces me to say here that it is equally uncertain and confused in its results. You see, Monsieur le Directeur, I have no illusions, but do not yourself be deceived by the favourable effects produced, nor by the wonderful cures you hear daily spoken of at Vichy.

We do not advance science by unexpected cures; we merely learn a sort of fortunate routine.

This is however a therapeutic question which we can easily explain to you, giving you afterwards by means of the measure glasses one of the ways of solving it.

Let us set out with this principle, that in order to attend upon and cure a patient, it is not enough to know and administer the remedies suited to his disease. This truth, is not sufficiently known, and appreciated, by the

public and it is proper to remark it. Therapeutic science, is an art more difficult and complicated; it requires more numerous qualities, and among them one more important which I wish to point out: clearness and precision. We must certainly be precise, it is the least of one's duties, when a man's life depends on what me write, and our precision must be such as to prevent the possibility of the patient from making a mistake.

Now as it is the dose which gives precision to the prescription, the dose without which there is no clinical science, no observation of any value, facts merely favourable or unfavourable, isolated and worthless. Of no value to science assuredly, as it cannot depend upon facts to form an exact opinion. They are neither a point of direction, nor instruction; they can neither verify nor confirm this first law in therapeutics, that the effects of drugs vary and change completely according to the doses used.

Thus we can never ascertain the exact knowledge of their real action. The all important art of medication therefore remains unquestionably a dangerous art; thus the labour and experience of our predecessors are

useless and unprofitable to us, and the physician confined to his own skill and experience, does the work of an empiric and not, I repeat of a man of learning, obtaining effects due to accident and which are not the anticipated and well reasoned results of his treatment.

This is equally true as to thermal and general therapeutics. You know as well as I do in what manner the drinkers take the waters and hurry through the treatment. It is curious indeed and even amusing.

But if you had perused the treatises of clinical Hydrology and medical memoirs in which thermal cures are noted down, in which the details of thousand of thermal, cures are given, you would judge on the other hand how little instructive they are.

No information can be gained from the observations; no fixed rule or serious element. Useless labour indeed, and incomplete labour besides, because precision and method do not exist in the administering the waters; because the dose of medicine prescribed and taken, was never exactly fixed, and consequently the physician finds himself always in contradiction

to the scientific rule which forms the very essence of therapeutics — to find the exact connection the remedy has to the patient and to the disease.

And thus all our thermal therapeutics are confined to simple and distant indications. It is known that mineral waters are ordered in certain diseases and are forbidden in others. I have myself in the most precise manner brought those indications to two axioms:

"The Vichy waters should not be given in diseases affecting the organs situated above the diaphragm; they are on the contrary efficacious in diseases affecting the organs situated below the diaphragm (Axioms 19 et 20)"

Now in these very cases in which the waters are prescribed one thing alone is known namely that they may or may not cure. I leave you Monsieur le Directeur to judge how far such results can be beneficial to science, but you who do not boast of your medical science, but who may become ill, which God forbid, would this state of things satisfy you in case of need?

Then again to say nothing of other necessary conditions for clinical observations, how is the exact dose prescribed, to be ascertained,

when the thermal treatment proved successful, and what it has been precisely when the waters have failed, how are we to know? That is the queſtion.

They speak of glasses, it is true, in books and in public, but the glass in use, you know fixes nothing, decides nothing, and explains nothing, except that the patients use it in drinking. Before the invention of glasses men drank the waters at the springs in the hollow of their hands, and mens hands differ too in size.

The glass is only of a relative size and is consequently a source of confusion.

In certain observations, according to the physician who made them, it measured 200 grammes, in others 200 or 300; as for the drinkers, they imagine it of all sizes and dimensions.

A mere matter of fancy, such as we see often at the springs.

A small glass at the spring *Mesdames*, a middle sized glass at the spring *Hopital*, an ordinary sized glass at the *Grande-Grille*, then at the *Celeſtins* spring they have the pint cup, and the large burgrave cup!

And each, fills and empties his glass drinker more or less, from five to twenty thirty times a day.

I do not wish to accuse any one, but I know the objection to be made : Of what use is it to look so closely at the quantity of water when all that is necessary is, to drink and to saturate one's self in order to be cured. In support of this objection they give M. Petit's opinion, who no doubt wishing to increase the sale of the waters, gives an instance of one of his patients who in a violent fit of gout drank 83 glasses of Vichy water in the same day, and *found himself the better for it.*

My answer is, that I may then offer poison to every body, and I may add that Mithridates used it freely!

It is useless, Monsieur le Directeur, to allude in writing to you to those deceptions and failures brought on by such fatal errors. But however we must free therapeutic science from such dangerous theories, which destroy all scientific notions, and devote thermal practice to ignorance or hazard and leave it powerless or dangerous. Add to that the discredit cast on the value of the waters and certain

complaints respecting the inconsiderate manner in which they are prescribed.

This however the public begin to underſtand. The patient has the right, and very juſtly so, of knowing the nature of the thermal treatment, and in his mind, the more seriously it is considered by the physician, the more attention will be paid to his complaint he is free to judge for himself and moſt certainly he does not go to consult a doctor to liſten to jeſting, and he by no means approves of the negligent manner in which his treatment is prescribed. He is, I consider, in the right, and the time has come when the waters muſt be seriously adminiſtered or the practitioner will have to exercise his talents and profession elsewhere.

It is in fact a revolution which has taken place. And what a surprise for the disciples and doctrines of M. Petit!

The necessity, in a scientific and in a practical point of view, of doses in therapeutics, being admitted, Monsieur le Directeur, you will not hesitate in adopting the reform of *measure glasses*.

I would certainly have much to add and to

write in order to prove how useful it is; but is it not in fact quite evident, and if I urged the point further you might believe that I wanted to trespass on you who are always willing to oblige.

To administer doses is for the physician to give proof of his learning and gravity; for the public it is to write in plain figures.

How many patients do we see at the springs most anxious to know the exact quantity of the water prescribed for them, and to follow the advice of their doctors, who themselves are embarrassed to know the exact quantity, and despair of doing so, owing to the want of this measure.

This is a great inconvenience which it would be necessary to remove, and it would be above all desirable to put an end to the obscurity and confusion which prevail in the thermal treatment.

The question should not alone consist in taking the waters and prescribing them. The patient should know the exact quantity he drinks, and he is anxious to know it, the physician should be able to say what it is.

When this is ascertained, the real value of

the waters will be known, otherwise observation and facts cannot be well observed nor could thus therapeutic action be accurately known.

Nor must we be told that precision in the administering of the water is an impossibility, because patients might be made to follow the rules of science and not exceed the medical prescriptions. No; because and we again repeat it, it is the gravity of the physician which makes the patient serious. When the physician speaks seriously and with conviction, the patient obeys and follows his advice when it lies in his power.

And you, Sir, who with the *measure glasses* offer this advantage to patients coming to seek health at our springs, you will have laboured and contributed with more efficacy than all the clinical works ever published, to enlighten the question of thermal therapeutics and you will also have performed a work beneficial to science and humanity.

The *measure glass*, such as I conceive it should be made, contains 200 grammes of mineral water, being a measure identical with that of the codex, and approaching the former dose of 8 ounces. It has over the other frac-

tions of the decimal syſtem, the advantage of being subdivided in round figures and not susceptible of any thing equivocal. It is a fortunate concession of the youthful medical generation to the old one, which unites in common accord all the physicians, cuſtom, and medical formulas.

This glass thus explained and underſtood, I would have, according to the model, divided into three or four parts of equal capacity, to measure, on one side, the 1/3 and 2/3 of the glass: 80 grs. 160 grs.: and on the other side 1/4, 1/2 and 3/4 or 60 grs., 120 grs. and 180 grs. For the facility and convenience of the drinkers I would get made a half glass of the total capacity 120 grs. with a graduation of 60 grs. the quarter of a glass, or the half of the half glassfull.

That makes three models which I give one after the other.

The *measure glass* divided into three parts: 80, 160, 240 grs.

The *measure glass* divided into four parts: 60, 120, 180, 240 grs.

The *half glass gradué* divided into two parts: 60, 120 grs.

Chemical analysis of the Springs belonging to the State.

Acids an Bases contained in each litre of the several springs	NAMES OF THE SPRINGS						
	Grande Grille	Chomel	Hopital	Célestins	Parc	Hauterive	Mesdames
Carbonic Acid	4·418	4·429	4·719	4·703	5·071	5·640	5.029
Sulphuric »	·164	·164	·164	·164	·177	·164	·141
Phosphoric »	·070	·038	·025	·050	·076	·025	traces
Arsenious »	·001	·001	·001	·001	·001	·001	·002
Boracic »	traces	traces	traces	traces	traces	traces	traces
Hydrochloric »	·334	·334	·324	·234	·344	·334	·222
Silica	·070	·070	·050	·060	·055	·071	·032
Protoxide of Iron	·002	·002	·002	·002	·002	·088	·012
D° Manganese	traces	traces	traces	trace	traces	traces	traces
Lime	·169	·166	·222	·160	·239	·168	·235
Strontia	·002	·002	·003	·003	·003	·002	·002
Magnesia	·097	·108	·064	·105	·068	·160	·136
Potash	·182	·192	·228	·163	·151	·098	·098
Soda	2·488	2·536	2·500	2·560	2·500	2.368	1·957
Bituminous Matter	traces	traces	traces	traces	traces	traces	traces
Totals	7·997	8·042	8·302	8·327	8·687	9·039	7·866.

Chemical analysis of the Springs belonging to the State.

QUANTITIES OF SALINE INGREDIENT CONTAINED IN EACH LITRE OF THE SEVERAL SPRINGS	NAMES OF THE SPRINGS						
	GRANDE GRILLE	CROMEL	HOPITAL	CÉLESTINS	PARC	HAUTERIVE	MESDAMES
Free Carbonic Acid	·908	·768	1·067	1·049	1·555	2,183	1·908
Bicarb. of Soda	4·883	5·091	5·029	5·103	4·857	4·687	4·016
» Potash	·352	·371	·440	·315	·292	·189	·189
» Magnesia	·303	·338	·200	·328	·213	·501	·425
» Strontia	·303	·003	·005	·005	·005	·003	·003
» Lime	·434	·427	·370	·462	·614	·432	·604
» Protox. of Iron	·004	·004	·004	·004	·004	·017	·026
» Manganese	traces	traces	traces	traces	traces	traces	traces
Sulphate of Soda	·291	·291	·291	·291	·314	·291	·250
Phosphate »	·130	·070	·046	·091	·140	·046	traces
Arseniate »	·002	·002	·002	·002	·002	·002	·003
Borate »	traces	traces	traces	traces	traces	traces	traces
Chloride of Sodium	·534	·534	·518	·534	·550	·534	·355
Silica	·070	·070	·050	·060	·055	·071	·032
Organic Bituminous Matter	traces	traces	traces	traces	traces	traces	traces
TOTALS	7·914	7·959	8·222	8·244	8,601	8·956	7·811

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Sulphuric »	·164	·164	·164	·164	·177	·164	·141
Phosphoric »	·070	·038	·025	·050	·076	·025	traces
Arsenious »	·001	·001	·001	·001	·001	·001	·002
Boracic »	traces	traces	traces	traces	traces	traces	traces
Hydrochloric »	·334	·334	·324	·234	·344	·334	·222
Silica	·070	·070	·050	·060	·055	·071	·032
Protoxide of Iron	·002	·002	·002	·002	·002	·088	·012
D° Manganese	traces	traces	traces	traces	traces	traces	traces
Lime	·169	·166	·222	·160	·239	·168	·235
Strontia	·002	·002	·003	·003	·003	·002	·002
Magnesia	·097	·108	·064	·105	·068	·160	·136
Potash	·182	·192	·228	·163	·151	·098	·098
Soda	2·488	2·536	2·500	2·560	2·500	2,368	1·957
Bituminous Matter	traces	traces	traces	traces	traces	traces	traces
Totals	7·997	8·042	8·302	8·327	8·687	9·039	7·866

Chemical analysis of the Springs belonging to the State.

QUANTITIES OF SALINE INGREDIENTS FOUND IN EACH GALLON OF THE WATER.	NAMES OF THE SPRINGS.

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